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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS

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METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS is a monthly publication devoted to:

- A. Current Abstracts in English on important meteorological and geostrophysical literature in every language.
- B. Bibliographic references to other items of interest to the profession.
- C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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MALCOLM RIGBY, Editor

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SPECIAL FEATURE IN THIS ISSUE

Bibliography on Outstanding Text and Technical Books of the Past Decade

By
Malcolm Rigby

(For table of contents see back cover)

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FOREWORD

Meteorological and Geostrophysical Abstracts is a monthly publication whose purpose is to bring to the attention of meteorologists, geophysicists and astrophysicists current literature in their field.

Part I contains abstracts of current literature in the fields of meteorology, etc.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically).

Bibliographies published in the successive issues were:

Vol. I, 1950

- | | | | |
|---------------------|-------------------------|--------------------|------------------|
| 1. Atmos. Pollution | 2. Aerobiology | 3. Cloud Physics | 4. Hail |
| 5. Tornadoes | 6. Volcanic Dust | 7. Climat. Changes | 8. Thunderstorms |
| 9. Icing | 10. Acoust. Propagation | 11. Evaporation | |

Vol. II, 1951

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|------------------------|---------------------------|-------------------|------------------------|
| 1. Extended Forecast. | 2. Long Range Forecast. | 3. Soil Temp. | 4. Constants, etc. |
| 5. Clim. of Near East | 6. Clim. of Middle East | 7. Special Winds | 8. Radar Storm Detect. |
| 9. Condensation Trails | 10. Clim. of N. E. Africa | 11. Mountain Met. | |

Vol. III, 1952

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|--------------------------|----------------------|-----------------------------|-----------------------|
| 1. Clim. of N. W. Africa | 2. Carbon Dioxide | 3. Clim. of Argentina, etc. | 4. Dew |
| 5. Objective Forecast. | 6. Stratus Forecast. | 7. Urban Climatology | 8. Clim. of C. Africa |
| 9. Visibility | 10. Glaze and Rime | 11. Free Air Turbulence | |

Vol. IV, 1953

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|----------------------|--------------------------|---------------|-----------------------------|
| 1. Turbulence Theory | 2. Turbulent Diffusion | 3. Frost | 4. Clim. of Australia, etc. |
| 5. High Level Winds | 6. Winds in Stratosphere | 7. Jet Stream | 8. Radiation Bioclim. |
| 9. Clim. of Pacific | 10. Auroras | 11. Sferics | |

Vol. V, 1954

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|--------------------|------------------------|--------------------------|--------------------|
| 1. Oceanog. Met. | 2. Clim. of S. E. Asia | 3. Auroral Physics | 4. Tropopause |
| 5. Balloons | 6. Numerical Forecast. | 7. Radiation Data | 8. Vertical Motion |
| 9. Clim. of Arctic | 10. Industrial Met. | 11. Wind Waves and Swell | |

Vol. VI, 1955

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|-------------------------|------------------------------|--------------------------|
| 1. Bibliog. of Bibliog. | 2. Texts & Monogr. Bibliogs. | 3. Storm Surges |
| 4. Ionospheric Prop. | 5. Photochem.—Upper Atmos. | 6. Cloud Physics |
| 7. Radar Cloud Physics | 8-9. Atmos. Nuclei | 10. Weather Modification |
| | | 11. Cooling Power |

Vol. VII, 1956

- | | | |
|--------------------------|-----------------------------|-------------------------|
| 1. Synoptic Met.-Arctic | 2. Clim. of Enclosed Spaces | 3. Cosmic Rays (-1952) |
| 4. Cosmic Rays (1953-56) | 5. Atmos. Radioactivity | 6. Inversions |
| 7. Snow Micromet. | 8. Snow Micromet. (Suppl.) | 9-11. Tropical Cyclones |

Vol. VIII, 1957

- | | | |
|----------------------------|--------------------------|---------------------------------|
| 1. Solar Weather Relations | 2. Night Airglow | 3. Forecasting Special Elements |
| 4. Forest Micrometeorology | 5. Hydromet. Forecasting | 6. Numerical Forecast. (Suppl.) |
| 7. Albedo | 8. Meteors | 9-10. Tropospheric Prop. |
| | | 11. Medical Meteorology |

Vol. IX, 1958

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| 1. Radioastronomy | 2. Solar Astrophysics | 3. Radioactivity in Atmosphere |
| 4. Waves and Currents | 5. Physical Oceanog. | 6. Dynamic & Phys. Oceanog. |
| 7. Long Range Forecast. | 8. Radar Met. | 9. Cosmic Rays |
| | | 10-11. Geomagnetism |

Vol. X, 1959

- | | | | |
|-------------------------------|------------------------------------|----------------------------|------------|
| 1. Works of C. E. P. Brooks | 2. Tornado Forecasting | 3. Soil Moisture | 4. Sferics |
| 5-6. Ozone | 7. Acoustic Waves | 8. Evaporation Measurement | |
| 9. Evapotranspiration (-1955) | 10. Evapotranspiration (1956-1959) | 11. Evaporation | |

Vol. XI, 1960

- | | |
|--------------------------------|--------------------------|
| 1. Outstanding Reference Works | 2. Outstanding Textbooks |
|--------------------------------|--------------------------|

Other bibliographies in preparation are:

<i>Forecast Verification</i>	<i>Ionospheric Physics</i>	<i>Radar Meteorology</i>
<i>High Atmosphere Temperatures</i>	<i>Ionospheric Propagation</i>	<i>Rocket Meteorology</i>

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DNLM:	U. S. National Library of Medicine, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts.
⑤	after an abstract indicates an abstract prepared for NASA.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet using a modification of the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146-151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, Jahrgang 2 (Vol. 2), Heft 5/6 (No. 5/6), pages 146-151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL AND GEOASTROPHYSICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

11.2-1 551.510.535 (08) 551.594 (08)
 †American Academy of Arts and Sciences, Boston, *Atmospheric explorations: papers of the Benjamin Franklin Memorial Symposium*. Ed. by Henry G. Houghton. Cambridge, Technology Press of Massachusetts Institute of Technology, and N. Y., John Wiley, 1958. 25 p. figs., tables, bibliogs., eqs. Price: \$6.50. (*Technology Press Books in Science and Engineering*.) (For listing of contents, see Pt. III, p. 309, Feb. 1959, *MAB*. All articles abstracted separately.) **DLC** (QC961.A4). Reviews by P. M. Saunders in *Weather*, 14(1):34, Jan. 1959, and by B. J. Mason in *Royal Met. Soc., Quarterly Journal*, 85(363):75-76, Jan. 1959.—The symposium was held on Jan. 11, 1956 in honor of the 250th anniversary of the birth of BENJAMIN FRANKLIN. The introduction emphasized FRANKLIN's interest in the upper atmosphere, in the aurora, lightning, electricity, whirlwinds, cyclonic storms and eclipses, but the papers presented are original contributions on cloud physics, thunderstorm electricity, lightning, the ionosphere and the upper atmosphere from a "weather" viewpoint by ROSS MUNN, JOACHIM KUETTNER, LEONARD B. LOEB, H. G. BOOKER and HARRY WEXLER. *Subject Headings*: 1. Benjamin Franklin Memorial Symposium 2. Upper atmosphere research 3. Electrical phenomena. I. Houghton, Henry G. (ed.).—*M.R.*

11.2-2 523.7(02)
 †**Handbuch der Physik, Band 50, Astrophysik I, Sternoberflächen-Doppelsterne*. [Handbook of Physics, Vol. 50, Astrophysics, Pt. 1, Stellar surfaces—binaries.] Berlin, Springer, 1958. 458 p. 167 figs., 20 tables, refs. at end of most ch., numerous foot-refs. and eqs. **DLC** (QC21.H327). Review by H. H. Voigt in *Die Naturwissenschaften*, Berlin, 45(23):580, Dec. 1, 1958. Review by H. A. Brück in *Journal of Atmospheric and Terrestrial Physics*, N. Y., 14(3/4):350, June 1959.—This volume of the *Handbook of Physics* contains 10 major articles (2 in German, 3 in French, and 5 in English) dealing with the broad physical and chemical aspects of astrophysics: classification of stars, stars with peculiar spectra, molecular bands in stellar spectra, spectra of planetary nebula, white dwarfs, visual binaries, eclipsing binaries, spectroscopic binaries, theory of stellar atmospheres and of planetary nebula. Solar spectra and solar atmospheres (chromospheric) and refraction in solar atmosphere are treated in appropriate chapters by SWINGS and BARBIER. Subject indexes are in all 3 languages. *Subject Headings*: 1. Handbook of Physics 2. Astrophysics handbooks. I. Barbier, Daniel 2. Swings, P.—*M.R.*

11.2-3 551.46(08) 551.46:92
 †Zubov, Nikolaï Nikolaevich, *Izbrannye trudy po okeanologii*. [Selected works on oceanology.] Moscow, Voennoe Izdatvo Ministerstva Oborony Soiuza SSR, 1955. 547 p. port., figs., tables, 103 refs. Chronological bibliog. of Zubov's works, p. 532-539. **DWB** 551.46 Z93iz, **DLC** (GC7.Z8)—A nicely edited and well bound edition of selected scientific works of N. N. ZUBOV, published on the occasion of his 70th birthday. A chronological listing of his works show that his oceanographic work began about 1929. Prior to that (1908-27) most of his published articles dealt with navigation. The works from 1929-1955 were concerned mainly with Arctic ice and other hydrographic problems. ZUBOV was born in Izmail in 1885. Other facts of his life are summarized by the editor (p. 3-4), and a sketch of his oceanographic work is given (p. 5-11) by A. D. DOBROVOL'SKIĬ. His work in teaching and textbook writing, the inauguration of a department of oceanology in the Moscow Hydro-

meteorological Institute (in 1932) and of a chair of oceanology at Moscow University in 1950 are mentioned. Works on rivers, lakes, canals, currents, ice, pressure effects on water and ice movements, tides, Arctic expeditions, etc. have been selected for this volume. *Subject Headings*: 1. Collected works of N. N. Zubov 2. Biography of N. N. Zubov 3. Zubov, N. N. 4. Collected oceanographic papers 5. Ice 6. Bibliographies.—*M.R.*

TEXTBOOKS AND TECHNICAL BOOKS

See also: Bibliog. of Outstanding Textbooks and Technical Books of the Past Decade, p. 265.

11.2-4

581.54(02):016

†Daubenmire, R. F. (*State Coll., Wash.*), **Plants and environment: a textbook of plant autecology**. 2d ed. New York, John Wiley, 1959. 422 p. 92 figs., 14 tables, 773 refs. DWB (M86:580 D235pL), DLC—A textbook dedicated to summarization of knowledge (and literature) of ecology: geology, soils, climate, chemistry, physics and zoology as they affect plant growth and evolution. Successive chapters deal with soil, water, temperature, light, atmosphere, fire, the environmental complex, and ecologic adaptation and evolution. The second edition has been updated and rewritten (in some places more than in others) in light of research since 1947. pH of soil is discussed on p. 42-49, salinity of soil on p. 49-58, and soil moisture on p. 104-136 in the chapter (3) on water. Other water factors are atmospheric moisture (humidity, cloud, fog, evaporation, transpiration, and their measurement), precipitation (forms, geography, effective seasonal distribution, drought), water balance of plants and classification of plants by water relationships. The chapter on the temperature factor (4) deals with temporal and spatial variations in temperature (color, plant cover, snow cover, urban microclimate, slope exposure, latitude, vertical gradients in and below soil surface, upper atmosphere and inversion, land-water distribution, ocean currents, etc.), plant temperatures and development, transpiration, phenology, cold benefits, cold injury, winter drought, high temperature injury, plant disease and temperature, effects of duration of temperature, effect on plant geography, temperature measurement and control (maximum-minimum, thermographs, thermocouples, thermistors, etc.). The chapter (5) on light goes extensively into radiation, illumination, photoperiodism, and light measurement and control. Ch. 6 takes up air pollution, CO₂, soil aeration, etc., and wind, windbreaks, wind uprooting, shaping, desiccation, dwarfing, lodging, abrasion, soil erosion and deposition, salt spray and snow cover, wind pollination and dissemination. The fire factor is discussed in some detail in Ch. 8 (p. 318-334), including the kinds of fires, adaptations, indirect beneficial as well as injurious effects of fire, and practical value of burning. The extensive list of references (773) has been brought up to 1956. Illustrations are profuse and devoted mainly to plant and forest or tree photos, with a few schematic diagrams. *Subject Headings*: 1. Plant ecology textbooks 2. Soil moisture 3. Temperature effects on plants 4. Wind effects on plants 5. Fire effects on plants 6. Moisture effects on plants 7. Plant ecology bibliographies.—*M.R.*

11.2-5

551.5:634.94:632.187(02)

*†Davis, Kenneth P. (*Univ. of Michigan*), **Forest fire control and use**. Ch. 3-4 by George M. Byram. Ch. 5 by W. R. Krumm. N. Y., McGraw-Hill, 1959. 584 p. numerous figs. and tables. Bibliog, p. 551-573. (*American Forestry Series*, ed. by Henry J. Vaux.) DWB (634.96 D262fo)—A unique textbook and reference manual for college and practical use in forestry and forest fire control activities and research, based mainly on U. S. developments since 1910 in this area. Pt. I consists of 7 chapters on forest fire behavior and effects: 1) types of fires, historic fires, effects on forest types; 2) effects on trees, microclimate, soil, vegetation; 3) combustion, heat transfer, moisture, wind, fuel propagation; 4) fire behavior, large and small fires, blow-up fires; 5) fire weather, seasons, stability effects, fronts, thunderstorms and lightning, weather modification; 6) forest fuels; 7) fire danger rating. Pt. II deals with fire control, reduction, detection, prevention, suppression methods and programs, etc. Pt. III takes up forest land management with respect to fire control, use of fire in silviculture, prescribed burning, costs of protection and history of fire control. An extensive bibliography gives standard U. S. references from books and journals, as well as experiment station publications listed alphabetically by chapters, and there is a good index. Although Ch. 5 on **Fire weather**

W. R. Krumm (p. 124-160) goes into most of the aspects of weather and climate in relation to forest fires, other chapters such as Ch. 3 by George M. Byram on **Combustion**, Ch. 7 on **Fire danger rating**, and Ch. 10 on **Detection** give more sophisticated approaches to such meteorological factors as wind-shear, turbulence and moisture exchange, quantitative estimates of inflammability and fire hazard, and atmospheric factors in visibility of fires by day and night, respectively, than are usually found in such textbooks. *Subject Headings: 1. Forest fire control textbooks 2. Fire danger rating 3. Fire weather 4. Combustion 5. United States.*
Krumm, W. R. II. Byram, George M.—*M.R.*

11.2-6

538.69:532.59(02)

†Cowling, Thomas George (*Univ. Leeds, Eng.*), **Magnetohydrodynamics**. New York, Interscience Publishers, 1957. 115 p. 17 figs., refs. at end of each ch., numerous eqs. (*Inter-science Tracts on Physics and Astronomy*, ed. by R. E. Marshak.) DLC (QC809.M3C65)—Magnetohydrodynamics has developed mainly through study of electrical and magnetic phenomena in stars or in the earth's outer atmosphere, rather than by laboratory experiments, since the time and space factors are too great to allow controlled laboratory analogs with any degree of precision to be valid and the cosmic phenomena cannot yet be controlled. Therefore information must be gained solely through observation or mathematical models. A continuous fluid anisotropic conductivity and no electron inertia effects, is presumed in such models. Accumulations of electric currents are ignored. Ordinary electromagnetic and hydrodynamic equations are employed. In the present textbook six main chapters are devoted to: 1. Generalities and simple applications; 2. Magnetohydrostatics (sunspot equilibrium, streamers and filaments, jets, stability, spiral arms); 3. Wave motion (stellar motion, torsional theory of sunspots, Alfvén's theory, magnetic variable stars); 4. Magnetic fields and instability (stability of flow due to convection and turbulence, darkness of sunspots due to magnetic inhibition of convection); 5. Dynamic theories (Elsasser's Eigenvalue theory, Bullard's theory, etc.); 6. Ionized gases, dissipation in hot and cool clouds. Vector notation is used throughout the book. *Subject Headings: 1. Magnetohydrodynamic textbooks 2. Astrophysics textbooks 3. Solar magnetic fields.*—*M.R.*

11.2-7

551.585.5(78,79)

†Jaeger, Edmund C., **The North American deserts**. With a ch. by Peveril Meigs and illus. by John D. Briggs et al. Stanford, Calif., Stanford Univ. Press, 1957. 308 p. 355 figs., maps, photos, bibliog. p. 299-302. DWB (574.5 J22no)—In this popular science book a desert is defined, problems of plants and animal life in deserts outlined, and weather and climate discussed (by PEVERIL MEIGS in Ch. 2), especially in relation to the desert areas of the Southwest, and then in successive chapters the peculiarities of the several desert areas of North America are treated: the Chihuahuan Desert, the Sonoran Desert, the Sahuaro Desert (Arizona upland), the Yuman Desert, the Colorado Desert, the Mohave Desert, Great Basin, Painted Desert, etc. Comparative temperature and precipitation data are presented for representative locations in each area in tables and histograms, showing seasonal and diurnal variations in these elements, and in wind speed. Climatic analogs with deserts of the Old World or South America are cited. *Subject Headings: 1. Arid region climatology 2. North American deserts 3. Southwestern United States.*—*M.R.*

11.2-8

551.5:519.2(02)

†Bendat, Julius S. (*Ramo-Wooldridge Corp., L. A., Calif.*), **Principles and applications of random noise theory**. N. Y., John Wiley, 1958. 431 p. 107 figs., 15 tables, 141 refs., numerous eqs. DLC (TK5101.B57). Review in *Royal Meteorological Society, Quarterly Journal*, 85(363):78, Jan. 1959.—Applications of random noise theory in meteorology, climatology, aeronautics, radio or radar propagation, and statistics are increasing rapidly, justifying the issuance of a reasonably advanced textbook on the basic principles of statistical communication theory, employing analytical methods for solution of problems. Applications are considered in many chapters of the text. The 10 systematic chapters cover: 1) random processes, engineering systems and correlation functions; 2) power spectra; 3) probability theory and random noise analysis; 4) optimum linear prediction and filtering; 5) autocorrelation functions; 6) analog computer techniques; 7) statistical errors in autocorrelation; 8) envelope

correlation; 9) optimum time variable filters; 10) zero crossing problem. The atmospheric turbulence problem is treated in Ch. 5 (Exponential—cosine autocorrelation functions) on p. 201–206; radar fading and tracking errors, angular scintillation (p. 206–211), and the space satellite problem (guidance under random meteorological conditions and errors) on p. 220 in Ch. 6 (Analog computer techniques). Random processes are defined as being synonymous to time-series or stochastic processes. Good bibliographies appear at the end of each chapter and a long bibliography at the end of the book. A summary of each chapter is given at the beginning of the book. Applications to meteorology, climatology and micrometeorology implied but not specifically mentioned in the text are manifold (e.g., periodicities, zero crossings for sine waves, envelopes, time variable weighting, analog computer errors, power spectra, autocorrelations, etc.). *Subject Headings:* 1. Random noise theory textbooks 2. Turbulence theory 3. Microwave propagation theories 4. Statistical theory in meteorology.—M.R.

11.2-9

550.1:551.468(02)

†Guilcher, André, **Coastal and submarine morphology**. Transl. by B. W. Sparks and R. H. W. Kneese. N. Y., Wiley; London, Methuen, 1958. 274 p. maps, diagrs., illus., bibliogs., index. Price: 30 sh.; \$6.50. DLC (GB451.G813). Review by Edwin Doran, Jr. in *Geographical Review*, N. Y., 49(3):444–445, July 1959. Review in *Geofisica Pura e Applicata*, 43:335, May/Aug. 1959. Transl. of original French, **Morphologie littorale et sous-marine**, issued Paris, Presses Universitaires de France, 1954. 210 p. DLC (GB451.G8)—The subject of the geology or geomorphology of the oceans and coasts has been treated extensively in the current literature but very few textbooks have been published summarizing the knowledge on this important phase of geophysics. The present text, first issued as a monograph in French in 1954, and now published in an attractive form in English, consists of two main sections: I. Coastal geomorphology and II. Submarine geomorphology. In Pt. I the active forces—waves, currents, runoff, infiltration, frost, wind, chemical and biological processes, shoreline movements, coastal features, and their classification and coastal evolution—are treated in 5 chapters. In Pt. II submarine geomorphology in general, the continental shelf, slope and canyons, and the deep sea floor are covered in 3 more chapters. At the end of each chapter there is an extensive bibliography well organized by sub-subjects valid to 1957 in the English edition. A few modifications and additions have also been made by the author to bring the 1954 edition up to October 1957. Many illustrations and line drawings are included. For another textbook on this subject, see Klenova, M. V. **Geologiya Miroia** [Marine geology]. Pub. in 1948 (2.8–185, Aug. 1951, MAB). *Subject Headings:* 1. Submarine geomorphology 2. Coastal geomorphology 3. Marine geology 4. Geomorphology textbooks 5. Translations.—M.R.

11.2-10

551.579(02)

†Sokolovskii, D. L., **Rechnoi stok (osnovy teorii i praktiki raschetov)**. [River runoff: fundamentals of theory and calculation techniques.] Leningrad, Gidrometeoizdat, 1959. 527 p. 203 figs., 106 tables, bibliog. p. 495–508, numerous eqs.—A systematic textbook on the basic principles and details for analysis of runoff data for determining annual runoff, seasonal and year-to-year variations, spring snow melt and summer storm rainfall runoff, flash floods, etc. The first chapter goes into the history of hydrological studies of river basins from Voeikov (1884) in Russia, A. PENCK (1898) in Central Europe, and F. H. NEWELL (1893) in the U. S. to recent studies in the U.S.S.R., Europe and America, especially of the effects of forests, lakes and bogs on runoff and agricultural practices. Ch. 2 covers the water balance of basins of rivers and lakes with emphasis on those of the U.S.S.R.; Ch. 3, the calculation of mean annual or “normal” runoff, coefficients of runoff and their determination by various methods, with nomograms included, isoline charts of runoff (examples of U.S.S.R. and Caucasus included); Ch. 4, variation in annual runoff over long periods and relation to precip. and other meteorological factors in specific basins, coefficients of correlation and theory of long-period statistical distribution; Ch. 5, seasonal variations and factors affecting them, persistence of daily runoff; Ch. 6, minimal runoff (low-water period, in late summer or winter), drying up or freezing of rivers; Ch. 7, spring and storm or shower flood runoff, and meteorological, snow, soil and other factors, types, methods of calculation of hydrographs, etc.; Ch. 8, runoff loads of silt, rock etc., flash and mud floods, etc. The book is highly technical with a great amount of theory

as well as statistical and graphical presentations of all kinds. *Subject Headings:* 1. Hydrology textbooks 2. Runoff calculations 3. Hydrographs 4. Runoff maps of U.S.S.R. 5. U.S.S.R.—M.R.

11.2-11

551.509.5:551.579.1(02)

*†Befani, A. N., *Osnovy teorii livnevoogo stoka, chast' 2*. [Basic principles of the theory of storm runoff, Pt. 2.] *Odessa. Gidrometeorologicheskii Institut, Trudy*, Vol. 14, 1958. 108 p. 33 figs., 60 tables, 152 refs., 407 eqs. **DLC** (Slavic)—This is the second part of a work on storm runoff, the first of which was published in Vol. 4 of this *Trudy* series. The volume is devoted to theoretical and graphical or empirical methods of calculating and forecasting storm runoff in a basin. The balance of runoff on slopes, soil, lakes, bogs and rivers; type of slope runoff; calculation of storm hydrographs; of depth of slope runoff; theory of channel processes; and calculation of maximum storm or shower runoff hydrographs comprise the subject matter of the 6 main chapters. The work is heavily weighted with mathematical formulas and theories, and contains a number of applications to actual situations in basins of the Ukraine. *Subject Headings:* 1. Storm runoff forecasting manuals 2. Hydrological forecasting 3. Ukrainian, S.S.R.—M.R.

11.2-12

551.511.33:551.521(02)

*†Eckert, E. R. G., *Heat and mass transfer*. Pt. A, Heat conduction and Appendix of property values by Robert M. Drake, Jr. 2d ed. of *Introduction to the transfer of heat and mass*. N. Y., McGraw-Hill, 1959. 530 p. figs., tables, foot-refs., bibliogs. throughout, eqs. (*McGraw-Hill Series in Mechanical Engineering*)—A substantial and high quality textbook on the basic processes of heat and mass transfer. New material on conduction, convection, radiation and thermal properties of substances has been added to that of the 1st ed. (1950, see 4A-129, April 1953, *MAB*) and most of the remaining part of the book rewritten. Boundary layer instability, cellular flow patterns (Bénard cells), free or natural convection, turbulent flow, velocity and temperature profiles and convective heat transfer are discussed in detail. Drag coefficients, evaporation, transpiration, turbulent transfer, etc. are also treated. Analytical methods are stressed throughout, and examination questions added to each chapter. The five major parts of the text, after the introductory chapter (which defines units, terms, modes of transfer, etc.), are: A) Heat conduction; B) Heat transfer by convection; C) Thermal radiation; D) Mass transfer, and E) Heat exchange. The part on thermal radiation consists of about 75 pages devoted to black bodies, solid and liquid bodies, gases, pyrometry, heat transfer coefficients for radiation, and solar radiation. Pt. D, on mass transfer, takes up equations for humid air, diffusion, boundary layer equations of mass transfer, similarity relations for mass transfer, and the evaporation of water into air. Many useful graphs, nomograms and tables are included. *Subject Headings:* 1. Heat and mass transfer textbooks 2. Convection 3. Radioactive transfer. I. Drake, Robert M., Jr.—M.R.

11.2-13

551.46(02)

*†Kent, John Latham, *Ships in rough water*. Edinburgh, Nelson, 1958. 287 p. 82 figs., 120 tables, bibliog. p. 280-283, eqs. Price: 32 sh. (*Nelson's Nautical Series*, ed. by Alfred Cecil Hardy.) **DLC** (VM149.K4). Review by K. Mann Hart in *Australian Journal of Science*, Sydney, 21(8):267, May 1959.—The first part of this technical or engineering type of textbook contains four chapters on ocean weather: winds, swells, relation of wind speed to wave dimensions and ocean currents. Many graphs are presented to show actual and theoretical limits of wave heights under different conditions, etc. Pt. II deals with ship movement on various ocean conditions: rolling, pitching, heaving, steering in rough weather, etc.; and Pt. III deals with wind and wave resistance in rough water, effect of hull design, propulsion efficiency, loss of speed, effect of intensity of weather, hull resistance in rough water and other practical problems. A good subject index is included. *Subject Headings:* 1. Rough water effects on ships 2. Wave dimensions 3. Marine meteorology textbooks.—M.R.

11.2-14

551.5:531.5(02) 551.501.8:531.5:358.1

Denisov, Iurii Stepanovich, *Radiotekhnika v artilleriiskoi meteorologii*. [Radio techniques in artillery meteorology.] Moscow, Izdatvo Ministerstva Oborony Soiuza SSR, 1958.

92 p. figs., tables, eqs. **DLC** (QC973.D45)—The basic principles and techniques of ballistics meteorology, radiosondes, use of radar, rockets and satellite in military (artillery) operations are set forth for the benefit of students, engineers, officers and other nonspecialists. Elements considered important are air temperature, pressure, humidity and wind, discussed on p. 6–16; effect of meteorological elements on flight of missiles, method of calculation and correction of trajectory, on p. 16–32; aerological measurements, on p. 32–62; radiosondes, on p. 62–75; radar tracking and sounding, on p. 76–89; and use of artificial earth satellites in meteorology on p. 89–93. Several types of radiosondes: Väisälä, Indian and Molchanov (U.S.S.R.) are described and illustrated. Many other instruments are treated in text and illustrated by schematic drawings, photographs or wiring diagrams. The general approach is engineering or instrumental. *Subject Headings*: 1. Ballistic meteorology textbooks 2. Radiosondes 3. Satellite observatories 4. Radar meteorology 5. U.S.S.R.—*M.R.*

11.2–15

523.7(02) 551.590.22

Kiepenheuer, Karl, **The sun**. Ann Arbor, Michigan, Univ. of Michigan Press, 1959. 160 p. 76 figs. (incl. photos). **DLC** (QB521.K613). Transl. by A. J. Pomerans of the original German, **Die Sonne**, issued Berlin, Springer-Verlag, 1957. 150 p. figs. (*Verständliche Wissenschaft*, Vol. 68). **DLC** (QB521.K6). Review by Ralph Shapiro in *American Meteorological Society, Bulletin*, 41(5):281–282, May 1960.—A well illustrated and not-too-technical text on the nature of the sun as the only star we can observe in detail, and its relation to terrestrial phenomena. Solar physics, solar research, the solar system (planets, comets, meteoroids, zodiacal lights, dust and gas); the sun's surface (granulation); solar radiation (use, solar constant, solar temp., spectrum, spectroscopy, chemical composition of sun); solar spectrographs and telescopes; eclipses; sunspots and solar changes (magnetic fields, faculae, flares, filaments, storms, prominences, corona); the interior of the sun; radio waves and bursts and, finally, solar, terrestrial and weather relations. *Subject Headings*: 1. Solar physics 2. Solar-weather relationships. I. Pomerans, A. J. (transl.).—*M.R.*

MONOGRAPHS AND COMPREHENSIVE PAPERS

See also: Effect of insolation through pine forest on snow melt (Miller), 11.2–105.

11.2–16

551.579.4:930.24(4) 551.524.36:930.24(4)

†Weikinn, Curt, **Quellentexte zur Witterungsgeschichte Europas von der Zeitwende bis zum Jahre 1850**, Hydrographie, Teil 1 (Zeitwende-1500). [Source book on the history of weather in Europe from the beginning of our era to 1850, Hydrography, Pt. 1 (from the beginning of our era to 1500).] Berlin, Akademie Verlag, 1958. 531 p. bibliog. p. v–viii. Alphabetical index of sources, p. 487–531. At head of t.p.: Deutsche Akademie der Wissenschaften zu Berlin. Institut für physikalische Hydrographie, Quellensammlung zur Hydrographie und Meteorologie, Band I. **DWB** (M(09) A313qu)—A scholarly and ambitious attempt at compiling a chronology of floods, droughts, severe winters and other abnormal weather phenomena in Europe from 27 B.C. to A.D. 1500, together with citations from chronicles, manuscripts, literature sources, etc. Storm floods; unusual ice covers on rivers, bays, lakes and seas; break-up of ice in rivers and related occurrences constitute the main type of events reported in this first volume. Besides the excellent alphabetical list of over 1000 original and secondary sources, there is a long geographical index. *Subject Headings*: 1. Chronology of floods in Europe 2. Chronology of severe winters 3. Flood chronology 4. Ice chronicles 5. Europe.—*M.R.*

11.2–17

551.579(969) 551.577.3(969)

†*Hawaii. Water Authority, **Water resources in Hawaii**. Honolulu, March 1959. 148 p. 60 figs., 9 tables, 65 refs. **DWB** (M79/969 H389wa)—Sec. I of this nicely reproduced report deals with sources of water in Hawaii: physical features affecting occurrence, the hydrological cycle, climate (rainfall, wind, temperature, evapotranspiration, pan evaporation [at 4 stations on graph and 18 stations in table], fog drip) and instrumentation, surface water and its measurement, storage, floods (1947–58), etc., ground water and its location, artesian wells and ground water research. Sec. II deals with water use and conservation of surface and ground

water, soil conservation, reforestation, cloud seeding (p. 55-56) and saline water conversion. Sec. III deals with water rights and Sec. IV with water development problems by islands. Variability of precipitation from year to year as well as from place to place is vividly portrayed by histograms of annual anomalies on each island (1928-57) and isohyetal charts of the islands. Many of the charts, diagrams and cross sections are in color. The last 60 pages of the report comprise isohyetal charts of each island showing median Jan. and Aug. rainfall plus tables of monthly 25-year median rainfall for 350 stations, and rainfall quartiles and extremes (annual, Jan. and Aug.) for various designated areas (5 on Hawaii, 5 on Maui, 2 on Lanai, 4 on Molokai, 1 on Oahu and 5 on Kauai), with total area and total volume of rainfall for area and per sq mi, respectively. The same data, but for each year from 1928-1956, is given in graphical form (for year, Jan. and Aug.) for each hydrographic area (millions of gallons per sq mi and inches per sq mi). Also, curves show monthly rainfall for selected gages on windward and leeward exposures on each island. Another table gives detailed chemical analyses of water from 18 sources in the territory. *Subject Headings:* 1. Rainfall variability, Hawaii 2. Water resources, Hawaii 3. Ground water, Hawaii 4. Hawaii.—M.R.

11.2-18

551.506.3:551.579.4(797)

Bodhaine, George Lawrence and Robinson, W. H., **Floods in western Washington.** U. S. Geological Survey, Circular, No. 191, 1952. 124 p. 28 figs., 14 refs. DLC (QE75.C5)—A thorough analysis of all available flood data for the many streams and rivers of western Washington, for the purpose of determining the magnitude and frequency of expected floods for recurrence intervals of 1.03 to 50 yrs. The composite frequency curve is based on combined frequency curves for all gaging stations with 5 yrs or more of record (131 stations). An equation is derived to show the relation between mean annual flood and basin characteristics. Errors and limitations in application of this formula are discussed. Curves of magnitude and frequency of floods at all stations with 15 yrs or more of record are included and the envelope of maximum recorded discharges in region is also shown. Graphs of mean daily discharges are given for 1 station. *Subject Headings:* 1. Flood frequency data 2. Floods, western Washington 3. Western Washington.—M.R.

11.2-19

551.509.54

*§Funke, P. W., **Pre-trough winter precipitation forecasting.** U. S. Air Force. Cambridge Research Center, Air Force Surveys in Geophysics, No. 84, Feb. 1957. 62 p. 46 figs., tables. DWB, DLC—An objective method is worked out for forecasting areas and amounts of winter precipitation for central and eastern U. S. and eastern Canada, based on surface, 850, 700 and 500 mb charts. Rain, snow, freezing rain, sleet and thunderstorms are included. Boundaries of precipitation areas are predicted qualitatively, and average maximum precipitation and boundaries thereof predicted quantitatively. Dependent data were for 1950-51, 1952-53, 1953-54 and 1955-56. Independent data were for 1954-55. Forecasts are for 0-12 and 12-24 hr periods, for all types of "over-running" cyclonic activity. Moisture distribution and movement, and vertical shear are used in qualitative forecast, and for the quantitative case, the relation of the moisture area to the 700 mb trough (when the 850 mb trough is west of the 100° meridian), plus lift. *Subject Headings:* 1. Objective precipitation forecasting 2. Winter precipitation forecasting 3. Eastern U. S. 4. Central U. S. 5. Eastern Canada.—M.R.

11.2-20

551.510.721

*†U. S. Atomic Energy Commission, **Theoretical possibilities and consequences of major accidents in large nuclear power plants: a study of possible consequences if certain assumed accidents, theoretically possible but highly improbable, were to occur in large nuclear power plants.** Its WASH-740, March 1957. 105 p. numerous figs., tables, refs. at end of each ch., eqs. DWB (539.752 U581th)—Various factors involved in estimating possible hazards from nuclear reactor accidents are analyzed in detail. Meteorological factors are discussed in Appendix E: Diffusion, deposition and rainout of the radioactive cloud (p. 45-71). In this study radiation dosage distribution is calculated for various typical meteorological conditions (including nocturnal temperature inversions, etc.). Results of the calculations are presented in diagrams showing fallout distribution as a function of particle size, distance from the accident and meteorological parameters. A considerable variety of distribution patterns is obtained

from different meteorological conditions. *Subject Headings*: 1. Nuclear reactor accidents 2. Radioactive fallout calculations 3. Radioactive rainout.—G.T.

11.2-21

551.553.6(794)

*U. S. Army. Chemical Corps. Biological Warfare Laboratories, Ft. Detrick, Md., Climatological wind survey, Camp Cooke, California, June 3-Sept. 12, 1955. Ft. Detrick, Md., Meteorology Branch, May 1956. 78 p. 19 tables, 5 charts. Carbon of typescript. DWB (M5 U581c)—Hourly wind direction and speed data at a height of 2 m for Camp Cooke, 3 mi from the Pacific Ocean in Santa Barbara County, Calif., are set forth in detail and analyzed with respect to hourly and monthly frequencies for June, July, Aug. and Sept. 1955. Data for July 1951-Dec. 1952 are appended (0630-1530 LST). Location of equipment, methods of analysis of data, frequency distribution and curves showing diurnal wind regime for each month are included. *Subject Headings*: 1. Wind frequency data 2. Diurnal wind regime 3. Camp Cooke, Santa Barbara County, Calif.—M.R.

11.2-22

551.577.37(521.1)

551.509.58:551.579.4

551.524.32:614.8(524)

†Japan. Meteorological Agency, Report on the meteorological disasters at various places over north Japan in 1956. Its *Memoirs*, 40(3), 1959. 179 p. numerous figs., photos, tables, refs., eqs. DWB—A series of detailed articles on various meteorological disasters in north Japan: 1) the cool summer which damaged rice crops in Hokkaido and north Honshu in 1956 (p. 1-75); 2) heavy rainfall in Tohoku District caused by a Bai-u front in July 1956 (p. 77-119); 3) heavy rainfall in the southern part of Tohoku District, July 14-17, 1956 (p. 120-181). Each report consists of several chapters—each giving local reports, charts, graphs, synoptic charts, river gage reports and curves showing data, as well as many photos of damage caused by floods to cities, crops, railroads, etc. Forecast problems are analyzed as well as rainfall intensity, duration and other hydrological data. *Subject Headings*: 1. Cold summer, N. Japan (1956) 2. Floods, N. Japan (July 1956) 3. Flood forecasting 4. Northern Japan.—M.R.

11.2-23

551.584.42:533.16:551.508.5

*Haugen, Duane A. (ed.), Project Prairie Grass, a field program in diffusion. U. S. Air Force. Cambridge Research Center, Geophysical Research Papers, No. 59, June 1959. Vol. 3. 673 p. numerous figs., tables, eqs., 12 refs. DLC. (For abstract on Vol. 1 and 2, see 10.8-19, Aug. 1959, MAB.)—Project Prairie Grass was a field program designed to provide experimental data on the diffusion of a tracer gas over a range of 800 m. This, the third volume of the report on the Project, contains descriptions of the fast-response instrumentation utilized for the measurement of wind fluctuations. The data reduction and analysis techniques are also presented along with voluminous tabulations of the results of the computations of the u , v and w components for different anemometer positions and different separation distances up to 90 m, for each run. Other derived data are also tabulated. *Subject Headings*: 1. Project Prairie Grass 2. Diffusion of tracer gases 3. Micrometeorological field programs 4. O'Neill, Nebr.—Author's abstract and M.R.

11.2-24

551.577.2:551.573:551.579.5(4)

Mohrmann, J. C. J. and Kessler, J., Water deficiencies in European agriculture: a climatological survey. International Institute for Land Reclamation and Improvement, Wageningen, Publications, No. 5, 1959. 60 p. 2 figs., 2 diagrs., 10 maps, 20 refs. English, French, German and Spanish summaries.—On the basis of an analysis of the climate in Europe, an investigation was carried out concerning the extent to which precipitation is capable of supplying crops with sufficient moisture. Ch. 2 deals with the effect on crop yield of soil moisture conditions. The calculations made are discussed in Ch. 3. The water shortages are calculated from the water balance $E_{\text{pot}} - (P + R) = \text{water shortage}$; where E_{pot} = potential evapotranspiration, P = precipitation, R = soil-root value. In this equation, however, the soil-root value is a factor which is greatly dependent on local conditions. It was therefore found desirable to draw up a purely climatological balance: $E_{\text{pot}} - P = \text{climatological precipitation deficit}$. With the help of averaged monthly figures this water balance was calculated for 287 meteorological stations scattered over the whole of Europe. The potential evapotranspiration was calculated by means of the Turc's formula. The results of calculations are mapped in various ways. Map I

shows respectively the climatological precipitation deficit as a total over the entire deficit period, up to and including the month of June, over the months of July, August and September, and over the period of growth of winter wheat. These maps illustrate clearly the difference between north and south, as well as the influence of mountainous regions which catch rainfall, generally resulting in a rain-deficient region behind the mountains. Map II illustrates the amount of the climatological precipitation surplus. Instead of the marked difference between north and south observed in the first maps, the difference between west and east is found to predominate in this case. Map III shows the duration of the deficit period. Map IV illustrates the total annual potential evapotranspiration. This map illustrates most clearly the difference between north and south caused by the difference in incoming radiant energy and temperature. Maps V show in how many years out of a period of ten years one may expect a climatological deficit of 50, 100 and 200 mm, respectively. *Subject Headings: 1. Water balance 2. Water deficiency 3. Potential evapotranspiration 4. Climatological surveys 55. Europe.—A.V.*

POPULAR METEOROLOGY

See also: North American deserts (Jaeger), 11.2-7.

11.2-25

551.5(023)

†Orr, Clyde, *Between earth and space*. N. Y., Macmillan, 1959. 253 p. 8 plates, bibliog. p. 235-245. Price: \$4.95. DWB (M10 075). Review by H. E. Landsberg in *Science*, Wash., D. C., 129(3361):1480, May 29, 1959. Review in *World Meteorological Organization, WMO Bulletin*, 8(4):223-224, Oct. 1959. Review by U. K. Bose in *Indian Journal of Meteorology and Geophysics*, 10(4):464-465, Oct. 1959.—A popular (poetic type) book attempting to show how we now (and hope to, even to a greater extent) control our environment, through knowledge of the atmosphere: wind, storms, rain, snow, hail, lightning, dust, pollen, sky and cloud color, sunsets, rainbows, acoustics, weather control, radioactivity, climate, pollution, the high atmosphere and space, climatic changes, jet streams, solar-weather relations, radar, etc. A very extensive bibliography is included and a good index. *Subject Headings: 1. Popular meteorology 2. Weather control.—M.R.*

11.2-26

523.1

Shapley, Harlow, *Of stars and men: the human response to an expanding universe*. Boston, Beacon Press, 1958. 157 p. 4 tables. Price: \$3.50. DLC (QB981.S48). Review by G. C. McVittie in *Science*, Wash., D. C., 128(3319):295, Aug. 8, 1958.—A popular treatment of the basic facts and theories of the expanding universe, with stress on cosmic philosophy and its influence on men and the evaluation not only of their physical but social and scientific character. The microcosm as well as macrocosm is treated—age of the earth and solar system, meteors, comets; collisions, cosmic chemistry, life on other stars; other kinds of life, turbulence in the universe, origin of life, growth of understanding and, finally, survival are treated in separate chapters or paragraphs. *Subject Headings: 1. Cosmology 2. Origin of universe 3. Origin of earth.—M.R.*

ATLASES, MANUALS AND HANDBOOKS

See also: Handbuch der Physik, 11.2-2.

11.2-27

551.506.1:551.509.21/22

Dzerdzeevskii, B. L., [Review of] *Meteorologicheskii Biulleten': ezhednevnye karty pogody mira i karty srednemesiachnykh znachenii atmosfernogo davleniia, geopotentsiala i temperatury vozdukh.* [Meteorological bulletin: daily charts of world weather and charts of mean monthly atmospheric pressure, geopotential and air temperature], July 1957, issued 1958. *Akademiia Nauk SSSR, Izvestiia, Ser. Geograf.*, No. 2:139-140, March/April 1959. This Bulletin is issued monthly by the Tsentral'nyi Institut Prognozov at Moscow. Scale 1-82,000,000 at 45° latitude. Charts of Arctic and Antarctic inset. DWB—The publication of world weather maps for the first time is hailed as an important scientific event and a major

contribution to the IGY. The bulletin includes not only daily maps for the surface and for pressure levels up to 100 mb, but also mean temperature, pressure, and geopotential height maps for the month, along with charts of temperature and pressure deviation from normal. DZERDZEEVSKIĭ is critical of the Central Forecasting Institute for not providing a detailed description of the methods and data sources used in computing the normals. He considers the scale of the Arctic and Antarctic maps too small for proper interpretation, and questions some of the synoptic analyses in the polar regions. These and other minor criticisms are offered in the hope that improvements can be made in future issues of the bulletin. *Subject Headings:* 1. Daily Northern Hemisphere maps 2. Soviet daily weather maps 3. World weather maps. I. Moscow. Tsentral'nyi Institut Prognozov.—R. S. Quiroz.

11.2-28

551.5:63:378

†Arléry, Raymond, *Éléments de météorologie agricole*. [Basic principles of agricultural meteorology.] France. *Météorologie Nationale, Notice D*, No. 1056, June 1954. 158 p. 27 figs., bibliog. p. 143-158. Mimeo.—Training course for persons in the various departments of the French Weather Service. Author draws attention to the importance, in agriculture, of certain aspects of meteorological phenomena. He mentions that this publication is intended for information rather than for teaching; its purpose is to acquaint the meteorologist with the work of the bioclimatologist. It includes 6 chapters: 1) Importance of climatology in agronomy and farming techniques (biometeorology, relationships between climatology and agronomy, ecology, investigation methods in bioclimatology and sources of documentation in agricultural meteorology). 2) "Heat" factor in agriculture (global radiation, temperature, influence of temperature on the rhythm of plant development, action of heat on the growth of plants, exceptional phenomena and injuries due to cold or hot weather). 3) "Water" factor. 4) Climatic indexes likely to characterize the "heat-water" complex in agronomy. 5) Meteorology and crop protection (cryptogamic diseases, parasitic insects, plant protection service, agriculture, aviation and meteorology). 6) Phenology. *Subject Headings:* 1. Agricultural meteorology 2. French Weather Service 3. Training in meteorology.—A. V.

11.2-29

551.511:551.551:628.53:539.1.07(02)

De Marrais, G. A., *Workbook in atmospheric diffusion calculations*. U. S. Atomic Energy Commission, [Pub.] IDO 12005, Feb. 1959. 61 p. 5 figs., 7 tables, 7 refs., eqs. DWB (M82.2/796 U587wo)—A selection and condensation of material from H. WEXLER, *Meteorology and atomic energy*, 1955 (see 7.1-1, Jan. 1956, MAB) to serve as a guide to study of diffusion problems at the National Reactor Testing Station and elsewhere. Behavior of stack effluents, determination of coefficients of diffusion, application of basic equations for cases of continuous point source, instantaneous point source (puffs, large volumes, total dosage downwind), ground deposition, cloud width and height and effective stack height, nomograms for atmosphere diffusion calculations, for maximum concentrations from continuous point source, and for plume spread, and their application. Appended are conversion tables, coefficients, a glossary of 32 terms and a few problems. *Subject Headings:* 1. Atmospheric diffusion workbooks 2. Stack meteorology 3. Atomic energy reactors.—M. R.

11.2-30

551.5:519.2:378(02)

Neuberger, Hans H. and Teweles, Sidney, Jr., *Applied meteorology and climatology including statistics: lecture notes*. Pub. by Turkish State Meteorological Service, Ankara, 1955. 50 p. Mimeo. figs., tables, eqs. (Notes from a course in the Meteorological Training Course at the Istanbul Technical University, 1954-1955). Bound with this title is the transl. into Turkish by Cemal Bergen, entitled *Tatbiki meteoroloji ve klimatoloji*. Ankara, 1955. 13 p. DWB (M(07) N478ap)—As a continuation of the series of manuals or texts for training courses in meteorology and climatology prepared by the authors during 1955 and 1956, the present manual covers, in an up-to-date and general manner, the practical aspects of meteorology and climatology such as applications to shipping, aviation, agriculture, growing degree days, (frost forecasting), bioclimatology, public utilities, construction (heating and ventilating), etc.; and in a more detailed manner applications of statistics (frequency distributions, of vectors, variability, significance, linear relations of variables, forecast verification, skill score, probability, etc.). Scores of questions based on the text are appended (for tests). Only the

first part (on applied climatology) is translated into Turkish. *Subject Headings:* 1. Applied climatology manuals 2. Statistics in meteorology 3. Training courses in meteorology. I. Bergen, Cemal (transl.).—M.R.

11.2-31

551.579:526.9(02)

†Il'in, I. A., *Issledovanie vod sushi (gidrograficheskie raboty)*. [Research on continental waters: hydrographic work.] Leningrad, Gidrometeoizdat, 1953. 255 p. 75 figs., tables, bibliog. at end of each ch. DLC (GB661.I4)—A working manual and text for technicians in the hydrometeorological service, or for students with basic knowledge of hydrology, topographical surveying and hydrometry. The four main sections deal with: 1) general types of methods of surface and aerial surveying of river, lake, swamp and glacier areas; 2) instruments and detailed methods of surveying continental waters of the above types, and of compilation of data; 3) special types of investigations such as runoff, current speed, channel processes, water temperature, chemistry, sediment load, evaporation from rivers and soil, waves etc., and equipment; 4) organization and equipment and supply of field surveys. Examples of forms, compilations, methods and photographs of equipment are included. *Subject Headings:* 1. Hydrologic surveying manuals 2. Surveying 3. Runoff.—M.R.

11.2-32

551.579:778.35(02)

†Kudritskii, Dimitrii M. et al., *Osnovy gidrograficheskogo deshifirovaniia aerofotosnimkov*. [Fundamentals of hydrographic analysis of aerial photographs.] Ed. by A. P. Domanitskii. Leningrad, Gidrometeoizdat, 1956. 343 p. 63 figs., 72 photos (some in pocket), 15 tables, 120 refs. DLC (GB665.K8)—A systematic treatise on interpretation of aerial photographs of regions with rivers, lakes and swamps for hydrologic or hydrographic purposes. Many examples of aerial photographs and stereographic methods used to extract useful data are presented. Equipment, geometrical aspects, photogrammetric techniques, interpretation under varying conditions of topography (mountainous, hilly, plains, forested plains), winter conditions, river bed interpretation, hydrotechnical constructions, vegetative and snow cover interpretation and swamp measurements, etc. are discussed. *Subject Headings:* 1. Aerial photography 2. Hydrologic surveys from aerial photographs 3. Aerial snow surveys 4. Cartography 5. Vegetative cover survey 6. U.S.S.R. I. Domanitskii, A. P. (ed.) II. Popov, I. V. III. Romanova, E. A.—M.R.

11.2-33

551.509.56/7(02)

U. S. Air Weather Service, *Severe weather warnings*. Its AWS Manual 105-41, Feb. 1, 1958. 30 p. 5 figs., 13 refs. Also its: AWS Manual 105-41, June 1, 1959. 24 p. 5 figs. "Supercedes Feb. 1, 1958 issue of same title." DWB (M(055) U58am)—The purpose of this manual is to serve as a guide to Air Weather Service detachment commanders in various areas of the world in issuing warnings to local authorities concerning tropical storms, local severe storms and other severe weather phenomena. Definitions, types of forecasts and of warnings, procedures, forms of bulletins and other details are described. *Subject Heading:* 1. Severe storm warning manuals.—G.T.

11.2-34

551.509.52:551.515.2(02)

§†U. S. Weather Bureau, *Hurricane forecasting*. Ed. by Jay S. Winston. Its *Forecasting Guide*, No. 3, April 1959. 108 p. 92 figs., 17 tables, 164 refs., 18 eqs. DWB (M09.3.U587fo)—A concise and up-to-date guide emphasizing the forecasting of hurricanes, with a minimum of material on the structure, mechanics, observation and analysis and climatology, except where these factors affect forecasting. The classification, life-cycle, climatology, history and organization of U. S. W. B. hurricane forecasting service, observational aids (surface, upper air, airplane, reconnaissance, radar, microseisms and sferics) formation and development and their short range prediction, motion (long, medium and short range techniques for prediction), dissipation or transformation, storm effects (wind, rain, floods and storm tides), and appendices giving examples of RIEHL, SIMPSON, VEIGAS and MILLER and JORGENSEN's methods, plus a good bibliography of recent (1951-58) technical papers on hurricane forecasting. Scores of graphical aids, synoptic and climatological charts are included. *Subject Headings:* 1. Hurricane forecasting manuals 2. Long range hurricane forecasting 3. Objective hurricane forecasting 4. Hurricane bibliographies. I. Winston, Jay S. (ed.).—M.R.

TRANSLATIONS

See also: Coastal and marine morphology (Guilcher), 11.2-9; Albedo of snow (Suga), 11.2-199.

11.2-35

551.507.362.2:551.510.535:551.521.64

Pravda, Moscow, Soviet artificial earth satellites: some results of the scientific investigations carried out by the two first Soviet sputniks. Trans. of original Russian in *Pravda*, April 27, 1958. 12 p. Reproduction by typescript. DWB (629.1388 S729)—From the successful launching of sputniks by the Soviet during 1957, scientists have been better able to study the upper atmosphere and cosmic space. Results of ionospheric and cosmic rays investigations have been obtained from the data transmitted from these sputniks. This paper discusses also the results of the medico-biological investigation of Sputnik II. The major part of the report is the analysis of the results of these satellites. *Subject Headings*: 1. Satellite observations 2. Sputniks 3. Upper air observations 4. Cosmic rays 5. U.S.S.R.—N.N.

11.2-36

551.578.482

Roch, André, Mechanism of avalanche release. U. S. Snow, Ice and Permafrost Research Establishment, Translation, No. 52, April 1956. 11 p. 2 figs., photos. Translation by Mary M. Atwater from original French in *Les Alpes*, No. 4, 1955.—A compilation of ideas about factors which should contribute to the release of avalanches. Mechanical factors are the static and kinetic internal friction, cohesion, equilibrium conditions, etc. Meteorological conditions are the most important to consider in evaluating and detecting the danger. Intense snowfall, rise of temperature and wind contribute to critical changes in the snow cover. *Subject Headings*: 1. Avalanches 2. Snow mechanics. I. Atwater, Mary M. (trans.).—A.A.

GENERAL GEOPHYSICS

IGY

See also: IGY ionospheric program, Dumont d'Urville (Lazarus), 11.2-47; IGY atmos. optics program (Weill), 11.2-48; IGY Antarctic program (Burkhanov), 11.2-49; IGY heat balance investigation (Lorius), 11.2-50; IGY Antarctic Symposium (Kort), 11.2-51; IGY satellite program, 11.2-75; IGY eclipse program (von Klüber), 11.2-285.

11.2-37

551.506.22(47)

Proekt mezhdudedomstvennogo plana nauchnoi obrabotki dannykh MGG i tematiki nauchno-issledovatel'skikh rabot na osnove etikh dannykh. [Plan of an interdepartmental program for the scientific analysis of IGY data and problems for scientific investigation based on these data.] *Akademiia Nauk SSSR. Mezhdudedomstvennyi Komitet po Provedeniiu MGG (IGY), Informatsionnyi Biulleten'*, No. 5:3-14, 1958. DWB—An outline, in the form of a table, is given of the various problems investigated during the IGY by Soviet institutions with the names of the individual institutions and organizations of the U.S.S.R. responsible for the various programs. The various problems are classified under the particular branch of geophysics and the names of the institutions are listed for each specific project. *Subject Headings*: 1. Soviet participation in IGY 2. U.S.S.R.—I.L.D.

11.2-38

551.506.22:523.5

van Woerden, H. (Leiden Observatory), Meteoroorwaarnemingen in het Internationaal Geofysisch Jaar. [Meteor observations in the International Geophysical Year.] *De Meteoroor*, Utrecht, 13(3/4):22-28, June/Aug. 1957.—Plans for meteor observation during the IGY are discussed. As compared to MILLMAN's program published in *Sky and Telescope*, the Dutch emphasis is on carefully calibrated work by individual observers rather than on group observations. Fields of view will be strictly limited and not more than 40° in radius. Attention is given to the statistics of meteor pairs separated by only a few seconds of time. Data recorded will include time of appearance, magnitude, radiant (shower), presence and duration of luminous train. Limiting magnitudes are determined by star counts in small areas of sky. *Subject Headings*: 1. Meteor observation 2. IGY meteor program.—A.V.

11.2-39

002:551.58

Arléry, Raymond, *L'amélioration de la documentation disponible pour les études de climatologie*. [Improvement in the documentation available for climatologic investigations.] *Annales de Géographie*, Paris, 68(366):154-155, March/April 1959. DLC.—After reporting the improvement and enrichment of the *Résumé mensuel du temps en France* [Monthly summary of the weather in France], published by the French National Meteorological Service, the author points out three world-wide projects which have been undertaken: world-wide meteorological charts of the IGY, mean charts by pentads, and charts of the normal values of pressure by pentads in the Northern Hemisphere. The world-wide meteorological charts, which will include for every day of the IGY a series of sea level and 500 mb charts subdivided in three parts: Pt. 1—Northern Hemisphere (U. S.); Pt. 2—Tropical zone (German Federal Republic); Pt. 3—Southern Hemisphere (Union of South Africa). The mean bi-weekly charts (by pentads) for the 700 mb level, for the period 1945-1955, have been elaborated by the meteorological service of the U. S. An atlas including the charts of normal values by pentads of pressure at sea-level for the Northern Hemisphere has been published by the University of Wisconsin. *Subject Headings*: 1. Climatological data 2. Monthly weather report, France 3. World-wide meteorological IGY charts 4. Mean pentadal Northern Hemisphere charts 5. Northern Hemisphere charts.—A.V.

11.2-40

551.506.22

Nikolaev, A. D., *Mirovoi tsentr dannykh MGG*. [IGY world data center.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby. Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyi Sbornik*, No. 4:106-108, 1957. DWB—A world center for all IGY data is being established in the U.S.S.R. under the direction of the Principal Directorate of the Hydrometeorological Service of the U.S.S.R. It is required to publish a periodic catalog of all material received and within two months to send copies of all material received to other world centers. The center will contain data in the form of tables, photographs, microphotographs and punch cards. The tables will contain the primary data for each point and period of time. All the tables will be microfilmed and their information will be catalogued by subject, date and place. The punch cards will represent the largest body of material. The operation of the World Data Center, including the preparation of punch cards and microphotographs, the utilization of punch cards, and the use of computing machines, etc., are discussed briefly. *Subject Heading*: 1. IGY data center.—I.L.D.

11.2-41

91.04(699.2) 551.576.1:778.3

Mullock, P. J. (*Radio Officer, Gough Island Sci. Survey 1955-56*), *Some weather observations on Gough Island*. *Weather*, London, 12(12):377-383, Dec. 1957. 7 figs. DWB, DLC—Gough Island (a volcanic island 8 mi X 4 mi) lies in the middle of the South Atlantic 230 mi SSE of Tristan da Cunha, at 40°20'S, 9°54'W. It rises to 3000 ft elevation. Below 1000 ft it is densely forested. J. B. HEANEY of Christ College, Cambridge, organized an expedition to investigate this island in 1954, and the expedition (the Gough Island Scientific Survey) sailed from England in September 1955, with 5 scientists from Cambridge and 2 from Oxford and Edinburgh. At Cape Town the Meteorologist, J. J. VANDER MERWE, joined the party, which spent 6 weeks on Tristan da Cunha and landed on Gough Island Nov. 13, 1955. After 5 months (May 13, 1956) the expedition was relieved by the South African Weather Bureau, which set up an IGY base there. The meteorological station was on the east coast at 23 ft above sea level (in lee of barrier). Vivid cloud formations that were photographed there are shown and described. *Subject Headings*: 1. Gough Island Scientific Survey 2. Cloud photographs 3. Gough Island, South Atlantic.—M.R.

WMO-IUGG

11.2-42

061.3:551.579

Ashford, O. M., *WMO and hydrology*. *World Meteorological Organization, WMO Bulletin*, 7(3):112-115, July 1958. photo. DWB—Various WMO activities and programs in hydrology, which are becoming increasingly important, are reviewed. The second session of the

WMO Panel on Water Resources Development, held at the Secretariat in Geneva, on March 14-24, 1958, the 25th session of ECOSOC in April 1958 (WMO represented by J. W. Osmund, M. A. Kohler and Louis Harmantas of the U. S. W. B.), the 10th session of the Executive Committee of the WMO, collaboration with ECAFE (Economic Commission for Asia and the Far East), and the Prague Seminar of ICID (International Commission on Irrigation and Drainage) in April 1958, are discussed with respect to hydrometeorological subjects. *Subject Headings: 1. WMO hydrology activities.—M.R.*

11.2-43

551.5:061.3

Zigun, V. P., *Desiataia sessiia Ispolnitel'nogo komiteta Vsemirnoi meteorologicheskoi organizatsii*. [Tenth session of the Executive Committee of the World Meteorological Organization.] *Meteorologiya i Gidrologiya*, Leningrad, 10:63-65, Oct. 1958. DWB, DLC—The tenth session of the Executive Committee of the WMO was held in Geneva in 1958. The Soviet Union was represented by A. A. ZOLOTUKHIN, a member of the Committee. The agenda included 67 questions for which more than 150 working papers were prepared. Various problems connected with the IGY program, activity of the WMO in the field of hydrology, meteorological service to jet aviation, etc. were considered. A special resolution on "The Responsibility of the WMO in the field of Hydrology" noted that there are various aspects of hydrology with which no specialized international agency is at present concerned; these will be taken up by the WMO when funds and personnel become available. The Committee noted the need to continue meteorological observations in Antarctica and to establish a free exchange of microcards with IGY data among participating world centers. The Soviet delegate opposed the use of radioactive substance to investigate the atmospheric circulation. The Executive Committee agreed to exclude this proposal from its resolutions. The Executive Committee examined more than 100 resolutions and recommendations and various technical problems, such as the investigation of the atmosphere by means of artificial earth satellites. *Subject Headings: 1. WMO. Executive Committee meetings 2. Geneva, Switzerland.—I.L.D.*

11.2-44

551.509.2/3:378.4(456.3)

Veranneman, N. L., *Seminar in Rome [on] synoptic meteorology in the Mediterranean. World Meteorological Organization, WMO Bulletin*, 8(2):68-73, April 1959. photo. DWB—Joint project of WMO and UNESCO held in Rome (Nov. 24-Dec. 13, 1958) at Headquarters of the Italian Meteorological Society and presided over by W. BLEEKER assisted by G. FEA and N. L. VERANNEMAN. R. SCHERHAG (Freie Univ. of Berlin) guided the map analyses and discussions. Twenty forecasters from 9 countries bordering the Mediterranean participated. Problems of Mediterranean forecasting considered at the seminar are discussed, deficiencies in observational data and upper air networks are outlined and the gist of the lectures by R. C. SUTCLIFFE, R. PONE, BLEEKER and H. C. BIJVOET and several Italian lecturers are given. *Subject Headings: 1. Synoptic meteorology seminar 2. Mediterranean synoptic meteorology.—M.R.*

11.2-45

550.3:061.3

Olczak, Tadeusz, *XI Zebranie ogólne Międzynarodowej Unii Geodezyjno-Geofizycznej w Toronto* (1957). [XIth General Assembly of the International Union of Geodesy and Geophysics, Toronto, 1957.] *Acta Geophysica Polonica*, Warsaw, 6(1):77-83, 1958. fig. DWB, DLC—Some information on the 11th General Assembly which took place in Toronto on 3-10 Sept. 1957 and was attended by 1156 geophysicists and geodesists from 48 countries. Eighty representatives of the Polish Academy of Sciences, the Polish Ministry of Higher Education and the Polish Central Administration of Geodesy and Cartography participated in it. The Associations of Meteorology and Oceanography, two of the seven bodies composing the Union, discussed the important subject of the circulation of planetary air and ocean waters. Several hundred reports (including several dozens presented by the Poles) were read at the Assembly. *Subject Headings: 1. IUGG meeting, Toronto, 1957 2. Toronto, Ontario.—A.M.P.*

ARCTIC RESEARCH

See also: Snow accumulation, Greenland (Bull), 11.2-251.

- 11.2-46 551.326.7:550.9(268)
 †Columbia Univ. Lamont Geological Observatory, **Age measurements and other isotopic studies on Arctic materials**. Contract AF 19(604)-1063, Final Report, Jan. 15, 1957. 6 p. Articles and appendixes (separately paged). Contents: Giletti, B. J.: **Tritium observations from T-3 Ice Island**. (9 p.) **Age measurements by the natural radiocarbon method**. (5 p.) Kulp, Wayne U.: **Oxygen isotope measurements on Arctic cores**. (45 p.) Ericson, David B.: **Lithological descriptions and micropaleontological analysis of Arctic cores**. (32 p.) **Thick source Alpha activity, Fletcher's Ice Island core No. 4**. (3 p.) **Bibliography** (21 refs.)—In order to understand certain geochemical and age relationships of materials of the Arctic region with reference to the origin of the Ice Island T-3, the research reported in this volume was undertaken. Discussions have been presented of the various activities connected with the program and the achievements made in age measurements by the natural radiocarbon method, tritium observations from the island and oxygen isotope measurements on Arctic cores. Examples, theories and the various results of investigations are described. Lithological descriptions and much of the micropaleontological analysis of Arctic cores are given in one of the appendices. *Subject Headings*: 1. Arctic Ice Island (T-3) 2. Age of Ice Island T-3 3. Radiocarbon dating 4. Tritium analysis 5. Arctic. I. Kulp, J. Laurence.—N.N.

ANTARCTIC RESEARCH

See also: Lowest temps. on earth (ten Kate), 11.2-204.

- 11.2-47 551.506.22:551.510.535(99)
 Lazarus, Félix, **Sondages ionosphériques (Base Dumont d'Urville)**. [Ionospheric soundings at the Dumont d'Urville Base.] (In: International Geophysical Year, 1957/1958. Comité National Français. Sous-Comité Antarctique Français, **Rapport d'Activité des Expéditions Antarctiques Françaises**. Paris, June 1958. p. 49-50.—Account of the program for ionospheric sounding from May, 1956, date of its establishment, to the beginning of February, 1958. *Subject Headings*: 1. International Geophysical Year, 1957-1958 2. Ionospheric soundings 3. Dumont d'Urville Base, Antarctica.—A.V.

- 11.2-48 551.506.22:551.593(99)
 Weill, Gilbert, **Optique atmosphérique (Base Dumont d'Urville)**. [Atmospheric optics at the Dumont d'Urville Base.] (In: International Geophysical Year, 1957/1958. Comité National Français. Sous-Comité Antarctique Français, **Rapport d'Activité des Expéditions Antarctiques Françaises**. Paris, June 1958. p. 53-58. fig., table.)—The investigation program included the observations of twilight, night airglow and auroras. For this purpose, the Base was fitted out with an automatic photometer for the night airglow and the auroras, with a panoramic camera, with a violet grid spectrograph and a red grid spectrograph. The photometer with the 3.914 filter often detects auroras which are not visible to the naked eye. The observations of the 3.914 N_2^+ band reveals that the morning intensity always is stronger than the evening one. A slight intensity and a marked rarity of $H\alpha$ were observed; the observed Doppler effect is weak or nonexistent. The statistical study of the visual observations of auroras in Adélie Land shows that the mean direction of the arcs passing near the Base is dependent on the time (hour). They remain fairly pointed Sun-wards. The auroral arcs appearing near the zenith of the station present a wide range systematic rotation dependent on the time (hour). *Subject Headings*: 1. International Geophysical Year 1957-1958 2. Optical instruments 3. Dumont d'Urville Base, Antarctica.—A.V.

- 11.2-49 551.506.22(47)
 †Burkhanov, Vasilii Fedorovich, **K beregam Antarktidy**. [Toward the coast of Antarctica]. Moscow, Morskoi Transport, 1956. 101 p. figs., ports, maps (part fold.), 55 refs. OLC (G860.B87)—A comprehensive pamphlet dealing with the history of the discovery and exploration of Antarctica, the nature of the continent, and the program of Soviet and foreign

expeditions that will explore Antarctica during the International Geophysical Year. The section devoted to the nature of the Antarctic contains ample information on the topography (p. 51-56); the climate (including temperature data, wind regime, atmospheric circulation, distribution of precipitation, p. 56-65); seas and ice conditions (p. 65-76) and the fauna. A detailed review of achievements in the exploration of the Soviet Arctic and the future program of investigations is presented at the beginning of the booklet (p. 9-37). *Subject Headings*: 1. IGY Antarctic program 2. Antarctic exploration 3. Soviet participation in IGY. —A.M.P.

11.2-50

551.506.22:551.511.33 (99)

Lorius, Claude, *Bilan thermique (Station Charcot)*. [Heat balance at the Charcot Station.] (In: International Geophysical Year, 1957/1958. Comité National Français, Sous-Comité Antarctique Français, *Rapport d'Activité des Expéditions Antarctiques Françaises*. Paris, June 1958. p. 85-86.)—For the purpose of heat balance study, the Station was fitted out with instruments for the measurement of temperature, wind, humidity and radiation. For the last element, the Station possessed a Linke actinometer, a recording solarimeter, an Ångström pyrheliometer and a Pers sunshine recorder. *Subject Headings*: 1. International Geophysical Year, 1957-1958 2. Heat balance 3. Radiation instruments 4. Charcot Station, Antarctica.—A.V.

11.2-51

551.506.22

Kort, V. G., *Antarkticheskiĭ simpozium v Vellingtone*. [Antarctic Symposium at Wellington.] *Priroda*, Moscow, No. 7:63-64, July 1958. **DLC**—The New Zealand National Committee of the IGY organized an Antarctic Symposium which was held in Wellington during Feb. 18-22, 1958. The participants of all expeditions directly engaged in the Antarctic during 1957-1958 were invited. A list of the Soviet delegation is given. Some of the reports of the non-Soviet delegates are summarized. These include the investigation on the thickness of the ice cover of western Antarctica and of the shelf ice of the Ross Sea, carried out by U. S. scientists, the determination of ice thickness by seismic methods in the southern magnetic pole by the French, etc. At the MacMurdo station the thickness of the continental ice sheet reached 4000 m and at the South Pole only 3000 m. The vertical magnetic component at the magnetic pole was measured as 71,280 gamma. *Subject Headings*: 1. Antarctic symposia 2. IGY Antarctic expeditions 3. Antarctica.—I.L.D.

11.2-52

551.509.318:551.575 (99)

Rubin, Morton J. (U. S. W. B.), *An occurrence of steam fog in Antarctic waters*. *Weather*, London, 13(7):235-238, July 1958. 2 figs., 4 refs. **DWB**—The USS "Curtis" approximately 15 mi from the northern edge of the Ross Ice Shelf, encountered a steam fog so dense as to obscure completely the horizon and reduce the visibility to 100 m. This continued from Feb. 7, 1957 1720 GCT until 0810 GCT the next day. There was a strong temperature inversion (988-954 mb) at Little America, and up to 933 mb over the ice shelf near the USS "Curtis" with cold continental air movement over warmer open sea. The super adiabatic lapse rate (996-956 mb) with the 3 mb difference in vapor pressure between sea and air saturated the cold air below the inversion and the fog was produced. Other localities in the Antarctic susceptible to such phenomena are indicated. The local and synoptic situations are presented graphically. *Subject Headings*: 1. Synoptic conditions for fog 2. Sea fog 3. Antarctica. —W.N.

SOCIETIES AND INSTITUTIONS

11.2-53

551.5:061.2

Houghton, Henry G. (Mass. Inst. of Tech.), *A national program for atmospheric research*. *American Meteorological Society, Bulletin*, 40(9):437-443, Sept. 1959. photo. **DWB, DLC**—A summary of the history, the preliminary planning and the actual plans of the U.C.A.R. (University Committee on Atmospheric Research) for a National Institute for Atmospheric Research, with a two page spread showing the architect's conception of the buildings and grounds as viewed from the air. The Executive Committee is composed of HENRY HOUGHTON of M.I.T., Chairman of the Board of Trustees; H. R. BYERS, Vice Chairman; and 8 others

from the University of Michigan, Arizona, Texas A. & M., Johns Hopkins, Cornell, U.C.L.A., Florida State, and Travelers Insurance Co. Facilities proposed include a flight squadron, an IBM 7090 class computer, a well equipped research library; radar equipment and shops and laboratories are proposed for instrumentation, data handling, spectroscopy, hydrodynamic research, physics, chemistry and mathematics. Five or six years would be required to staff the Institute and 4 years to construct buildings and facilities which would cost 35 million dollars, with an added 38 million dollars for operational expenses the first 6 years and a continuing budget of 15 million dollars per year thereafter. The Institute should be near a university but the exact site is not proposed, since it is to be national in scope, if not international. Funds have not yet been appropriated, however. *Subject Headings: 1. National Institute for Atmospheric Research 2. University Committee on Atmospheric Research.—M.R.*

11.2-54

550.3:061.2

†Associazione Geofisica Italiana, 7th, Rome, Nov. 7-9, 1957, *Atti [Proceedings]*. Pub. Rome (1958?). 124 p. figs., tables, refs., eqs. (For listing of contents, see Pt. III, p. 960, June 1959, *MAB*. All articles abstracted separately.)—The 7th Annual Assembly of the Italian Geophysical Association met on Nov. 7-9, 1957, at the National Research Council in Rome. The first session was devoted to a Symposium on Physical Oceanography, presided over by ALBERT DEFANT. IGY and IUGG (Toronto) affairs and participation were discussed. It is mentioned that a bibliography of Italian geophysical papers covering 1954-56 was published for the Toronto meeting. Transactions and a list of officers are included. *Subject Heading: 1. Italian Geophysical Society meetings.—M.R.*

SERVICES

11.2-55

551.5:061.1(410)

†Sutcliffe, R. C. (*Director of Res., Met. Office*), *A decade of research. Meteorological Magazine*, London, 87(1037):321-331, Nov. 1958. 34 refs. **DWB, DLC**—A detailed summary of the main contributions to research in meteorology by members of the Meteorological Office staff since the reorganization in 1948, at which time research was made equal to services in status. Such names as BROOKS, BRUNT, DOUGLAS, DURST, GOLD, GOLDIE, SCRASE, SIMPSON, TAGG, SUTTON, WHIPPLE (and not mentioned—SUTCLIFFE, himself) testify to the emphasis placed on research during the past decade, just as during the period from 1905-1925 when HAPIER SHAW and GEORGE SIMPSON gathered a group of world-famous research workers around them. Contributions in the past decade number hundreds of Meteorological Research Papers, 22 Geophysical Memoirs, 33 Professional Notes and 20 Meteorological Reports, many papers in scientific journals and a number of books. Examples in climatology, marine meteorology, synoptic meteorology, numerical prediction, structure of fronts and the jet stream, long range forecasting, physical meteorological instruments, cloud physics and rain making, radiation, diffusion and turbulence, wave motion over mountains, turbulence, evaporation, convection, radar, etc., are cited and a long bibliography appended. *Subject Headings: 1. Meteorological research 2. British meteorological research contributions 3. British meteorological service 4. Great Britain.—M.R.*

11.2-56

551.5:061.1(410)

Zigun, V. P., *Reorganizatsiia meteorologicheskoi sluzhby Velikobritanii*. [Reorganization of the Meteorological Service of Great Britain.] *Meteorologiya i Gidrologiya*, Leningrad, No. 9:48-50, Sept. 1958. fig. **DWB, DLC**—The author presents a brief account of the organizational history of the Meteorological Service of Great Britain, the functions of the Meteorological Service after it became part of the Ministry of Aviation and of the aims and recommendations of the special committee set up in 1955, under the chairmanship of LORD BRABAZON, to survey the organization of the Meteorological Service and the present and future needs for weather services of Great Britain. The recommendations of the committee are summarized and the proposed reorganization of the weather service is described with the aid of a diagram showing the organization structure of the Weather Service of Great Britain. The recommendations included the separation of the weather service and scientific investigations, separation of the

scientific and housekeeping administration, establishment of a new assistant directorship, replacement of the Meteorological Committee by a Consultative Committee, coordination of research, etc. *Subject Headings:* 1. Meteorological service development 2. British meteorological service 3. Great Britain.—*I.L.D.*

11.2-57

551.5:63:061.1 (09)

†Kulik, M. S., *Agrometeorologicheskaja sluzhba za 40 let*. [Forty years of agrometeorological service.] *Meteorologija i Gidrologija*, Leningrad, No. 11:32-40, 1957. 53 refs. DWB, DLC—The role of agricultural meteorology in the agricultural development of the U.S.S.R. is discussed with the aid of specific examples such as the meteorological and hydrological resources of the virgin lands, study of light and relief conditions favoring the growth of particular crops, etc. At present there are 1130 soil moisture observing stations and more than 2400 meteorological and agrometeorological stations serving agriculture. Since 1938 the Central Institute of Forecasting has been in charge of agrometeorological forecasting; it is also in charge of agrometeorological research. Some of the scientific and practical attainments of agrometeorological research include the following: methods of observation on developmental stages of agricultural crops; the establishment of the numerical indices of the effective temperatures of various growth stages; the dependence of plant growth upon moisture supply; the estimation of productive moisture resources of the soil; the soil moisture regime during the winter; the development of numerical indices of the harmfulness of sukhovei winds as a function of moisture content of the air and soil; establishment of the fact that the reduction of the productive soil moisture in the 0-20 cm layer to 19 mm initiates the dry period, and to 9 mm—the drought period begins; the agroclimatic conditions for the wintering of winter crops; agroclimatic classification; the microclimatic aspects of freezes, etc. *Subject Headings:* 1. Agrometeorological services 2. Soviet agricultural meteorology 3. U.S.S.R.—*I.L.D.*

11.2-58

551.5:061.1 (47,517)

Zigun, V. P., *Vazhnyj shag v razvitii sovetsko-mongol'skogo sotrudnichestva v oblasti gidrometeorologii*. [An important step in the development of Soviet-Mongolian collaboration in the field of hydrometeorology.] *Meteorologija i Gidrologija*, Leningrad, No. 3:67, March 1957. DWB, DLC—The U.S.S.R. and the Mongolian People's Republic signed a five year agreement for further collaboration between the hydrometeorological services of these respective countries. According to the terms of this agreement the U.S.S.R. is pledged to promote the development of the synoptic service, further hydrological research, provide help in training technical personnel and supply instruments to the hydrometeorological and aerological services of the Mongolian People's Republic. *Subject Headings:* 1. Meteorological service development 2. Hydrologic services 3. International cooperation in meteorology 4. U.S.S.R. 5. Mongolia.—*I.L.D.*

CONFERENCES AND SYMPOSIA

See also: Benjamin Franklin Memorial Symposium, 11.2-1; Antarctic Symposium (Kort), 11.2-51; Weather modification conf. (McDonald), 11.2-160; Jet stream conf. (Eichenberger), 11.2-228.

11.2-59

551.5:63:061.1

Rudnev, G. V., *Soveshchanie nachal'nikov agrometeorologicheskikh stantsii*. [Meeting of directors of agrometeorological stations.] *Meteorologija i Gidrologija*, Leningrad, No. 4:61-62, April 1958. DWB, DLC—In November 1957 the directors of agrometeorological stations and representatives of the Central Forecasting Institute, Central Geophysical Observatory, etc. held a conference in order to consider the participation of the agrometeorological stations in the scientific research of the central and regional institutes of the hydrometeorological service and the development of regional studies relating to agricultural production. The participants discussed some of the climatological studies being carried out by agrometeorological stations in various parts of the U.S.S.R. (effect of climate upon seed production of hay, soil-climatic classification of the Ukraine, etc.), the need for investigating the agrometeorological requirements of specific crops in various regions of the U.S.S.R., the combination of meteorological

ological and agrometeorological observations in network instructions, etc. *Subject Headings:* 1. Agrometeorological conferences 2. Agrometeorological research 3. Soviet agrometeorological service 4. U.S.S.R.—*I.L.D.*

11.2-60

551.521.64:061.3(428.1)

Wolfendale, A. W., *Cosmic Rays Conference at Durham, Sept. 1958.* *Nature*, London, 182(4645):1281-1283, Nov. 8, 1958. DWB—A report on the Physical Society Conference on Cosmic Rays, held at University of Durham on Sept. 24 and 25, 1958. Its theme was the cosmic and geophysical significance of cosmic ray measurements and the nuclear physics of single particle interactions. The discussions are given but conclusions reached indicate that there is still much to be learned about each of these aspects. *Subject Headings:* 1. Cosmic ray conferences 2. Durham, Eng.—*N.N.*

EDUCATION, HISTORY AND BIOGRAPHY

HISTORY

11.2-61

550.380.2(94)(09)

Dooley, J. C. (*Bureau of Mineral Resources, Melbourne*), *Centenary of Melbourne-Toolangi Magnetic Observatory.* *Journal of Geophysical Research*, Wash., D. C., 63(4, Pt. 1): 731-735, Dec. 1958. 14 refs. DWB, DLC—History of magnetic observations in Australia, beginning with the Hobart Observatory (1846-1850) which was part of the British Colonial Observatories scheme under EDWARD SABINE, and the nearly continuous records for 100 years from May 1, 1858 at the Flagstaff Gardens in Melbourne and later at Toolangi, with instruments devised by LAMONT for hourly readings during the first 5 years; later photographic recording magnetographs were installed. During 1863-64, a network of 230 stations 30 mi apart was established by NEUMAYER throughout Victoria. Absolute instruments were installed in 1867. Much of the data has never been scaled or published but a project is under way to extract hourly values for 1938-48 by semi-automatic trace reading equipment. 1949-53 data have been processed and will soon be published. *Subject Headings:* 1. Melbourne-Toolangi Magnetic Observatory 2. History of Melbourne Magnetic Observatory 3. Melbourne, Australia.—*M.R.*

11.2-62

551.5:061.1(569.4)(09)

†Israel. Meteorological Service, *Book of ten years of the Meteorological Service of Israel.* Tel Aviv, 1958. 73 p. figs., photos, map, tables. In Hebrew. Title in Hebrew: *Sefer He-Asor Shel Ha-Sherut Ha Meteorologi L'Medinat Yisroel.* (All articles abstracted separately.) DWB (M(06) 185se)—The Decade Book of the Meteorological Service of Israel was produced by the Ministry of Communication in 1958. The book, as the title indicates, is a broad survey of the meteorological activities undertaken in the first ten years of Israel's existence. It consists of eight signed articles. One article commemorates the unfortunate death of the pioneer Israeli meteorologist, RUDOLF FEIGE. There are articles dealing with various facets of the Israeli Meteorological Service. Other articles discuss the meteorological features of Israel and its different areas. Finally, there is a list of Israeli publications on meteorological subjects in English. The book is almost entirely in Hebrew. *Subject Heading:* 1. Israeli Meteorological Service 2. History of meteorological services 3. Israel.—*I.S.*

BIOGRAPHY

See also: Biog. of N. N. Zubov, 11.2-3.

11.2-63

551.5:92

Chapman, Sydney (*Alaska Univ. & High Alt. Obs., Boulder, Colo.*), *Fredrik Carl Mülertz Störmer, 1874-1957.* *Royal Society of London, Biographical Memoirs of Fellows*, 4:257-279, Nov. 1958. photo, 17 eqs. Reprint issued as *Alaska. Univ. Geophysical Institute, Contributions, Ser. B*, No. 28, 1958. Also: [Obituary note on] *Fredrik Carl M. Störmer.* *Polar Record*, 9(58):57, Jan. 1958.—CARL STÖRMER (1874-1957), was an outstanding scientist of

Norway. His interest, passing through natural sciences and pure mathematics, finally centered on auroral problems. In this regard the complicated problem that attracted his attention was that of the motion of a charged particle in the field of magnetic point dipole. His papers on this subject constitute a major part of his life's work; they number at least 48. The present biography records his life and surveys the broad span of his scientific work, especially his theoretical studies of auroral problems. The second article includes reference to STÖRMER's part in organizing the observation and photographing of auroras in the Arctic and Antarctic during the Polar Year 1932-33. *Subject Headings: 1. Biography of Fredrik Carl M. Störmer 2. Störmer, Fredrik Carl M.—I.S.*

11.2-64

551.5:92

Simpson, George C., *Obituary of Sir Gilbert T. Walker*. *Weather*, London, 14(2):67-68, Feb. 1959. DWB—Born at Rockdale, Lancashire, June 14, 1868, died Nov. 4, 1958; educated at Trinity College, Cambridge, went to India to reorganize and head the Weather Service in 1904, although he was a mathematician and had never read a word of meteorology and was untrained in administration. His first 3 meteorologists were PATTERSON, FIELD and SIMPSON, all of whom became directors in Canada, India and Britain. Devoted much of his time to the application of mathematics or statistics to forecasting the monsoon in India—scientifically important but, practically, not of much value. He retired from the Indian Meteorological Service in 1924 to succeed SIR NAPIER SHAW as Professor of Meteorology at the Imperial College of Science in London, where he did experimental work on turbulence and thermals until his retirement in 1934. *Subject Headings: 1. Obituary of Sir Gilbert Walker 2. Walker, Sir Gilbert T.—M.R.*

BIBLIOGRAPHY

See also: Plant ecology bibliogs. (Daubenmire), 11.2-4.

11.2-65

551.510.42(73):016

†Wohlers, H. C. and Bell, G. B., *Literature review of metropolitan air pollutant concentrations—preparation, sampling and assay of synthetic atmospheres*. Stanford Research Institute, Menlo Park, Calif., Contract DA-18-064-404-CML-123, Final Report, Nov. 30, 1956. Loose-leaf; each section repaged. figs., tables, refs. DWB (M(51) S785re)—After a 4 page summary of work done under project, there are voluminous appendices consisting of tabulations of measured concentrations of all chemical and particulate pollutants in and near 30-50 industrial centers in U. S., Canada and England, and a bibliography of 40 pertinent articles (Appendix A, 32 p.). Concentrations were calculated (in Appendix B, 30 p.) by using average inversion heights and daily wind movements for 7 major metropolitan areas and emissions from various kinds of operations were tabulated and curves presented to predict average and max. concentrations per capita. In Appendix C (12 p.) is given summary tables of measured and calculated air pollutants taken from literature and from meteorological calculations as in Appendix B. Appendix D (17 p.) goes very thoroughly into methods for handling air pollution simulants in test chambers; Appendix E (104 p.) into sampling and analysis techniques (38 refs.) Dozens of graphs, line drawings, photos of equipment, etc. are included with tabular material. *Subject Headings: 1. Air pollution data for U. S. 2. Air pollution literature surveys.—M.R.*

11.2-66

530.1:016 551.5:016

†Parke, Nathan Grier, III (*Parke Math. Labs., Inc., Carlisle, Mass.*), *Guide to the literature of mathematics and physics, including related works on engineering science*. 2d rev. ed. N. Y., Dover Publications, Inc., 1958. 436 p. DWB (016.51 P237g). "Dover edition is rev. and expanded version of the first edition, published by McGraw-Hill, 1947."—A systematic list of standard reference works to 1956 and textbooks in various branches of mathematics and physics, including over 5000 entries under about 150 subject headings. In addition, there is a section on principles of reading and study with application to physics and mathematics, with some of the best known current (and less well known historic) sources such as dictionaries, tables, handbooks, encyclopedias, textbooks; a guide to "reconnaissance" and study, teaching,

writing, research, searching and finally, a section on periodicals, periodical searching and on citations. The section on Geophysics (p. 231-232) cites 17 works on Meteorology and 11 on Geophysics which are essentially meteorological. *Subject Headings: 1. Physics literature guides 2. Geophysical literature sources.—M.R.*

PRACTICAL AND APPLIED METEOROLOGY

OCEANOGRAPHY

See also: Selected works on oceanology (Zubov), 11.2-3; Coastal and submarine morphology (Guilcher), 11.2-9; Ships in rough water (Kent), 11.2-13; Buoy weather stations (Brooks), 11.2-133; Wind stress on water (Lauwerier), 11.2-190; Ocean waves (Bascom), 11.2-226; Sea salt nuclei formation (Woodcock), 11.2-234; Bibliog. of Outstanding Textbooks and Technical Books of the Past Decade, p. 265.

11.2-67

551.556.8:551.461.2(261.2) 551.509.59

Weenink, M. P. H. and Groen, P., **A semi-theoretical, semi-empirical approach to the problem of finding wind effects on water levels in a shallow partly-enclosed sea.** *Akademie van Wetenschappen te Amsterdam. Afdeling voor de Wis- en Natuurkundige Wetenschappen, Proceedings, Ser. B, Physical Sciences*, 61(3):198-213, 1958. 4 figs., 14 refs., 30 eqs. **DLC—**For the type of sea basins considered here the wind effect on sea level height may be considered as being the sum of an equilibrium (quasistationary) effect and a correction to it, due to the variation in time of the wind field. For the equilibrium effect, which is a good first approximation to the actual wind effect, equations are derived containing three empirical parameters, viz.: a wind-stress factor f , which links the wind stress to the square of 0.75 times the gradient wind velocity and which, for a specific place and a specific season, is supposed to be (climatically) a function of wind direction (α); a bottom stress factor r , which links the bottom friction stress to the vertically averaged current velocity in the sea; and a "leak capacity" factor λ , which, in the case of a sea having a more or less narrow outlet (leak), such as the Straits of Dover is for the North Sea, determines what is called the "leak current." The equations are put into a form which makes it possible, on one hand, to determine the parameters mentioned by comparison with empirical data on equilibrium wind effects (as collected by SCHALKWIJK), and, on the other hand, to draw up graphs or tables for practically forecasting wind effects from the wind field. From data on wind effects from the southern part of the North Sea at the Hook of Holland, values of $f(\alpha)$ and λ were derived (the value of r having been adopted from BOWDEN). The effects of nonstationarity are dealt with in two different manners, viz. empirically (according to methods due to SCHALKWIJK and WEENINK) and theoretically, by a method of successive approximation. *Subject Headings: 1. Physical oceanography 2. Wind effect on sea level 3. Forecasting wind effects 4. Hook of Holland, North Sea.—Authors' abstract.*

11.2-68

551.510.41:551.511:546.264

Suess, Hans E. (*Scripps Inst. of Oceanog.*), **Residence time of CO₂ in the atmosphere from C¹⁴ measurements.** (In: California. Univ. Scripps Institution of Oceanography, *Proceedings (of the) Conference on Recent Research in Climatology*, March, 1957. Issued Univ. of California. p. 50-52.) **DWB (M8 C153co)**—It has been found earlier that carbon dioxide exchange from the atmosphere to the sea is not instantaneous, but that a certain hold-up time exists at the ocean-atmosphere interface. From CO₂ production rate by fuel combustion since the industrial revolution, and a comparison of C¹⁴ activity in wood grown 50-100 yrs ago and growing today, the atmospheric hold-up time is calculated to be 7 ± 3 years, in agreement with results obtained by two other methods. *Subject Heading: 1. Carbon dioxide exchange ocean-atmosphere.—G.T.*

11.2-69

551.465:532.593(210.5)(64)

Casablanca. Centre Météorologique, **La forte houle du 10 au 15 décembre 1957 sur les côtes Marocaines.** [Strong sea swell of Dec. 10-15, 1957 on the Morocco Coast.] *France. Comité Central d'Océanographie et d'Étude des Côtes, Cahiers Océanographiques* (continuation

with same vol. numbering of its *Bulletin d'Information*) issued by Service Hydrographique de la Marine, Paris, 11(1):25-36, Jan. 1959. 14 figs., table. **DWB, DLC**—Information about the sea swell of Dec. 10-15, 1957 on the Morocco coast as obtained from Casablanca, Northwest Africa, the center of meteorological observation in Morocco. The report gives the conditions under which the study was made. It examines the meteorological factors and includes an analysis of the results of the investigations on the swell. *Subject Headings*: 1. Ocean swell 2. Morocco Coast.—N.N.

11.2-70

551.464(261.2)

*Armstrong, F. A. J. and Butler, E. I. (both, Plymouth Lab.), **Chemical changes in sea water off Plymouth during 1957.** *Marine Biological Association of the United Kingdom, Journal*, 38(1):41-45, Feb. 1959. 3 figs., 3 tables, 8 refs. **DLC**—The results of analysis of sea-water samples from the International Hydrographic Station E1 during 1957 are given in graphical form and as integral mean values for the water column of 70 m. The seasonal variation shows the consumption of nutrients during the spring growth of plants to have been: phosphate 0.29 μg atom P/l., silicate 2.75 μg atom Si/l., inorganic nitrogen 8.0 μg atom N/l. At the time of winter maximum the N/P ratio was 20/1 by atoms or 9.2/1 by weight. The ratio of these elements consumed was 27.6/1 by atoms or 12.4/1 by weight. Unusual vertical distributions of silicate were found in April and August and are attributed to laminar water movements. *Subject Headings*: 1. Sea water composition 2. Chemical oceanography 3. Plymouth Sound, Eng.—*Author's abstract.*

11.2-71

551.526.4

La Fond, E. C., **Environmental factors affecting the vertical temperature structure of the upper layers of the sea.** *Andhra Univ., Waltair, India, Memoirs in Oceanography*, 1:94-101, 1954. 24 figs., 12 refs. **DLC** (GC1.A55)—After a brief classification of the factors, each is described and explained, accompanied by visual aid in form of a rectangular block 3-D, front side of which is furnished with bathythermograms in the form of temperature-depth-curves, vertically from surface down to 500 ft, horizontally from 30°F to 90°F and with the sun, cloud, rain, etc. pictured as the case may be. *Subject Heading*: 1. Vertical water temperatures.—W.N.

11.2-72

551.526.4:582.261

Uyeno, Fukuzo, **Water movements and distributions of diatoms in a vertical section of the cold water region off Enshu-nada, Japan.** *Kobe, Japan. Marine Observatory, Memoirs*, 12(1):7-14, Feb. 1958. 4 figs., table, 8 refs. **DWB**—In this investigation diatoms in different regions of water were studied. Results showed that where the cold water region disappeared, the part densely populated by diatoms was at the northern periphery of the Kuroshio, both in the euphotic and the disphotic zones. Where the cold water region was clearly marked, densely populated parts were found at the surface of both peripheries of the cold water region, and densely distributed part in the disphotic zone was found along the isotherms of 12° and 14°C which show a mountain-like shape. There were no diatoms in the center of the upwelling. At the surface of the cold water region, there was a divergent flow at the center and convergent flows in both peripheries. Diatoms fall vertically at the portion where the isotherms run horizontal, while they fall along the isotherms at the position where the isotherms are declined. In the latter case, a downward movement of water must be taken into consideration along the declined isotherms. *Subject Headings*: 1. Diatom distribution 2. Water movement 3. Enshu-nada, Japan.—*From author's abstract.*

11.2-73

551.526.6:551.508.29(261.25)

Barnes, H. (*Marine Station, Millport, Scotland*), **Sea surface temperatures at Millport.** *Marine Biological Association of the United Kingdom, Journal*, 38(2):423-424, June 1959. table, ref. **DLC**—Sea surface temperature was taken at 0900 GMT each day in the period 1949-1958 at this station, located at 55°44'55"N lat., 4°54'20"W long. For some years the temperature was measured in F°; at present it is measured by the bucket method and in C°, read to a tenth of a degree. The tabulated temperatures in C° are given for mean, maximum, and minimum for each month of the year, for annual mean and for the 10-year average for each

Month. The great variation of temperature has ecological significance. Annual mean in 1949 was 10.48°C ; in 1958, 9.49°C . *Subject Headings*: 1. Sea surface temperatures 2. Bucket temperature measurements 3. Millport, Scotland.—W.N.

11.2-74 551.526.6:551.465(263)
Bjerknes, Jacob, *Temperaturförändringen i Golfströmmen i tidsrummet för klimatförändringen i Norden*. [Temperature trends in the Gulf Stream during the period of climatic improvement in Northwest Europe.] *Ymer*, Stockholm, 79(2):148-158, 1959. 5 figs. DWB, DLC—This lecture was given at the Svenska Sällskapet för Antropologi och Geografi, on "Vega Day" April 24, 1958 when the author was presented with the Vega medal. The intermittent positive and negative changes of the Gulf Stream are described and discussed in relation to meteorological causes, particularly in the periods 1890-1933, 1921-1929 and 1929-1936, for which maps are shown. The causes of the increased sea surface temperature since 1921 in the higher latitudes are conditioned by short termed cyclic variations. The decreased intensity of the Icelandic low accompanied by a weakening of the west wind south of the center and reduced cyclonic vorticity of the wind field over the bulk of the northern region and higher pressure together favored a higher stability of the oceanic surface temperature. The long term variations of oceanic temperature and climate may be of solar origin but the interior mechanism of the seas, according to the theory advanced by ROSSBY, stands a good chance of establishing a comprehensive and convincing theory of ice periods and warm interglacial periods. *Subject Headings*: 1. Sea surface temperatures 2. Climatic variations 3. Temperature trends 4. Gulf Stream.—W.N.

ASTRONAUTICS—SATELLITE OBSERVATORIES

11.2-75 551.506.22:551.507.362(47)
*†Akademiia Nauk SSSR. Mezhdunarodnyi Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, *Predvaritel'nye itogi nauchnykh issledovaniĭ s pomoshch'iu pervykh sovetskikh iskusstvennykh sputnikov Zemli i raket: sbornik stateĭ, XI razdel programmy MGG (Rakety i sputniki), No. 1, 1958*. [Preliminary results of scientific investigation by means of the first Soviet artificial earth satellites and rockets: collection of articles in connection with Section 11 of the IGY program, Rockets and Satellites, No. 1, 1958.] 149 p. tables, refs., eqs. Contents: Gindin, E. Z.; Leĭkin, G. A.; Lozinskii, A. M. and Masevich, A. G., *Opticheskie nabludeniiia iskusstvennykh sputnikov Zemli* [Optical observations of artificial earth satellites], p. 5-30. 4 figs., 28 tables. English summary p. 21. Al'pert, Ia. L.; Chudesenko, E. F. and Shapiro, B. S., *Rezultaty issledovaniia vneshnei oblasti ionosfery po nabludeniiam za radiosignalami pervogo iskusstvennogo sputnika Zemli* [Results of studies conducted in the outer regions of the ionosphere by observations of radiosignals of the first artificial earth satellite], p. 40-108. 18 figs., 26 tables, 15 refs., 28 eqs. *Mediko-biologicheskoe issledovaniia na raketakh* [Medico-biological studies on rockets], p. 109-149 includes the following articles: Galkin, A. M. et al, *Issledovaniia zhiznedeiatel'nosti zhivotnykh pri poletakh v germeticheskikh kabinakh raket do vysoty 212 km* [Investigations on the vital functions of animals during flights in hermetically sealed rocket cabins to an altitude of 212 km], p. 112-129. 12 figs., 5 tables. English summary p. 129. Bugrov, B. G. et al: *Issledovaniia zhiznedeiatel'nosti zhivotnykh pri poletakh v negermeticheskoi kabine raket do vysoty 110 km* [Investigation on the vital functions of animals during flights in non-hermetically closed rocket cabins to an altitude of 110 km], p. 130-149. 9 figs., 2 tables, 18 refs. English summary p. 148-149. All articles abstracted separately. DWB. *Subject Headings*: 1. IGY satellite program 2. Satellite observations 3. IGY rocket program 4. Soviet satellites.

11.2-76 551.501.81:551.507.362.2
Davies, J. G.; Evans, J. V.; Evans, S. et al. (*all, Jodrell Exp. Station, Manchester Univ.*), *Radar observations of the second Russian earth satellite (Sputnik II 1957 β)*. *Royal Society of London, Proceedings, Ser. A*, 250(1262):367-376, March 24, 1959. 3 figs., 2 tables, 7 refs. DWB, DLC—A description is given of the radar observations of the second Russian earth satellite (Sputnik II, 1957 β) using the 80 m steerable radio telescope at Jodrell Bank on fre-

quencies of 36 and 100 Mc/s. An investigation of the fading characteristics of the echoes suggests that the observed fading arises from (i) Faraday rotation, (ii) ionospheric scintillation, (iii) rotation of the satellite. Evidence is produced which suggests that (i) was not the principal cause of the fading under the conditions of these experiments, and that (ii) the scintillation effects arise in a diffracting region at a height not greater than 220 km, which is contrary to the results obtained in the study of the scintillation of radio stars. The effect (iii) seems to have been responsible for most of the observed fading and it would appear that the satellite was rotating about an axis which was nearly perpendicular to its major axis. The effective scattering area of the satellite at 100 Mc/s was of the order of 15 m^2 but at 37 Mc/s it varied between 10 and 500 m^2 . From this it is concluded that the satellite was a long object having a reradiation polar diagram with one major and many minor lobes. No evidence was obtained to indicate that the satellite produced any ionization detectable at these frequencies, although it was observed as late as the third orbit before final burn up. Successful contacts were made on only about one-quarter of the transits observed. It has been possible to establish in retrospect whether the satellite passed through the main beam of the aerial. Such an analysis shows that on many occasions where no echoes were obtained the telescope was correctly positioned, and the failure to obtain echoes on these occasions is attributed to deep fading introduced by the rotation of the satellite and by Faraday rotation of the plane of the radio waves. *Subject Headings:* 1. Soviet satellite, Beta one 2. Radar observation of satellites.—*Authors' abstract.* ⑤

11.2-77

551.507.362.2

Hagen, John P., **Vanguard satellite launching vehicle—placing the satellite in orbit.** *American Geophysical Union, Geophysical Monograph*, No. 2:119-132, 1958. 11 figs., table. **DLC**—A comprehensive account of the IGY Vanguard satellite and its launching vehicle is presented. The author discusses in detail the following: the physical characteristics of the satellite package; the orbital requirements; the satellite orbit as a function of the earth's gravitational field and atmospheric drag; lifetime of a satellite; the character of the orbit as determined by the satellite's position and velocity vectors when it is projected into orbit; the perturbing effects on the orbit exerted by air density and nonuniform shape of the earth; the planned inclination of the plane of the orbit to the plane of the earth's equator; means of controlling the time the satellite should remain in orbit; temperature balance of the satellite; the current satellite design, including inside package, antennae and mechanism for separating satellite from the third stage; the design dimensions, flight plan and guidance plan of the satellite launching vehicle and the launching program. *Subject Headings:* 1. Vanguard rocket and satellite 2. Satellite orbits 3. Satellite launching.—*I.L.D.*

11.2-78

551.507.362:629.136.3:551.510.53

Janicki, W., **Erforschung der äusseren Erdatmosphäre mit Raketenflugzeugen und künstlichen Erdtrabanten.** [Exploration of the outer layers of the atmosphere by rocketplanes and artificial satellites.] *Schweizerische Technische Zeitschrift*, Berne, 54(20):429-441, May 16, 1957. 10 figs. **DLC**—IGY satellite program covering: direct and indirect geophysical information that can be obtained by satellites on the following phenomena: temperature, pressure and density of the air in the outer atmosphere, distribution of the mass in the earth's crust, geodetic information, meteorites, solar radiation, density of hydrogen in the interplanetary space, cosmic rays and polar auroras. *Subject Headings:* 1. Rocket observation of the upper atmosphere 2. Satellite observation of the upper atmosphere 3. IGY satellite program.—*A.V.*

11.2-79

551.507.362.2:551.508.25:551.521.64

Ludwig, George H. (Dept. of Physics, State Univ. of Iowa), **Cosmic-ray instrumentation in the first U. S. earth satellite.** *Review of Scientific Instruments*, N. Y., 30(4):223-229, April 1959. 8 figs., table, 9 refs. **DWB, DLC**—The first U. S. satellite, 1958 Alpha (Explorer 1) carried instrumentation to measure cosmic ray intensity, micrometeorite impacts and temperatures within the satellite. The instrumentation was designed with emphasis on conservation of electrical power, on stable and reliable operation, on operation over a wide range of

temperatures, and on compactness and mechanical ruggedness. The cosmic ray instrumentation in 1958 Alpha operated according to expectations, providing several hundred recordings of data received during transits over ground stations. These data led to the discovery of a belt of high-intensity radiation around the earth. *Subject Headings:* 1. Satellite cosmic ray recordings 2. Cosmic ray measurement techniques 3. Satellite instrumentation.—*Author's abstract.*

11.2-80

551.507.362.2:551.510.53

†Paetzold, H. K., *Die oberste Erdatmosphäre nach Satelliten-Messungen*. [The upper atmosphere seen from satellite observations.] *Die Naturwissenschaften*, Berlin, 46(13):416-422, July 15, 1959. 7 figs., 3 tables, 46 refs. **DLC**—With the aid of artificial earth satellites, it is possible to study the ionosphere situated above the F_2 -peak level. In particular, the frequencies used in the Russian satellites (20 and 40 Mc/s) gave interesting results according to which the electron density seems to decrease slowly above the F_2 layer. Fading observed in the reception of these radio signals indicates the presence of heterogeneities in the ionization, particularly in the polar zones. For the explanation of a kind of periodic fading, it is necessary to consider the rotation of the satellite and of the antennae and also the influence of the geomagnetic field. Temperature and density values of the upper atmosphere can be deduced from the observation of the deceleration of artificial satellites. The temperature at 1000 km is of the range of 2000°K, a value suitable to explain the escape of helium. Oscillations of the value of the deceleration are associated with local variations of density and temperature. The discovery of the Van Allen radiation belts, where particles are trapped in the geomagnetic field, is due to the cosmic ray equipment of earth satellites. The "Argus" experiment (explosion of A bombs at an altitude of 500 km) showed the possibility of creating temporary radiation belts observed between the two natural belts by satellites then in orbit. *Subject Headings:* 1. Upper atmosphere 2. F layers 3. Electron density 4. Satellite observation of the upper atmosphere.—*A. V. ©*

11.2-81

551.507.362:551.506.22:061.3(73)

Porter, Richard W. (*General Electric*), **Rocket and satellite programs**. *American Museum of Natural History, N. Y. Hayden Planetarium, Contributions, Ser. 1*, No. 1:10-17, 1958. **DWB** 551 A512co)—Details of the U. S. rocket and satellite plans for IGY which include study of atmospheric pressure, temperature, density and winds, aurora and airglow, ionosphere, meteorology, geodesy, radio and the launching and tracking stations, etc., are discussed at some length. *Subject Headings:* 1. IGY rocket and satellite program 2. U. S. participation in IGY.—*M. R.*

11.2-82

551.507.362.2:551.501.89

Singer, S. Fred (*Assoc. Prof. of Physics, Univ. of Md.*), **Minimum earth satellites as storm patrol**. *Scientific Monthly*, Wash., D. C., 85(2):95-98, Aug. 1957. 5 figs., 4 refs. **DWB, DLC**—The author, in his discussion of the minimum earth satellites as "storm patrol," has laid great emphasis on the role of meteorology and its application, since the weather of the earth affects all the phases of human existence. Satellites do possess the singular ability of observing weather conditions in even the most inaccessible areas of the globe. This report contains an evaluation of the application of a minimum satellite (altitude 200-300 mi) to the problem of recognizing meteorological features in order to observe their time variation in position and intensity. *Subject Headings:* 1. Satellite uses 2. Storm detection.—*N. N.*

11.2-83

574.6:551.507.362.2

Life sciences experiments using earth satellites. *American Geophysical Union, Transactions*, 39(4):782-783, Aug. 1958. **DWB, DLC**—During May 14-17, 1958 a symposium, attended by some 350 engineers and life scientists, was held in Washington, D. C. to discuss the possible uses of earth satellites for experiments in the life sciences. The meeting was sponsored by the National Academy of Sciences, the American Institute of Biological Sciences and the National Science Foundation. *Subject Heading:* 1. Satellite uses.—*N. N.*

GLACIER ICE AND SEA ICE

See also: Age measurement of Arctic ice, 11.2-46; Snow cover effect on sea ice (Holtsmark), 11.2-252.

11.2-84

551.321

Shumskii, P. A., **The main problems of modern glaciology in the light of investigations by Soviet scientists.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 1957, (Transactions), Vol. 4, pub. 1958.* p. 453-454. DWB, DLC—A brief summary of the problems of modern glaciology is given as studied by Soviet scientists. Modern glaciology studies all the ice on the globe. This extensive field includes the entire earth's cryosphere which comprises ice on rivers and lakes, snow cover, glaciers, and ice in the atmosphere, as well as in other places. *Subject Headings: 1. Glaciology 2. U.S.S.R.—N.N.*

11.2-85

551.506.9:551.326.8:551.481/2(71)

*Canada. Meteorological Branch, **Break-up and freeze-up dates of rivers and lakes in Canada.** Its CIR-3156, ICE-2, Jan. 30, 1959. 92 p. mostly tables. DWB, DLC—Data for 87 rivers and 113 lakes, bays and harbors for 1 to 130 years includes dates on which ice first moved or broke, when water was ice-free, when ice first formed and when the body of water was completely frozen over. Meteorological records for nearby stations, newspaper files, records of power companies, public utilities, harbor commissions, transportation companies, government agencies, missions, the Royal Canadian Mounted Police and private companies and individuals were used. A regular program for reporting the freeze and breakup dates is now in effect and results will be published later. Means and extremes are given for all records of 10 years or more. *Subject Headings: 1. Ice breakup 2. Freeze-up 3. River ice data 4. Lake ice data 5. Canada.—M.R.*

11.2-86

551.509.329:551.326.7(268)

Karakash, A. I., **Prognoz polozheniia kromki l'da na Barentsevom more.** [Forecast of the position of the ice edge in the Barents Sea.] *Meteorologiya i Gidrologiya*, Leningrad, 9:16-21, 1958. fig., 13 refs., 5 eqs. DWB, DLC—The author discusses the atmospheric conditions associated with the appearance of ice in the Barents Sea and the possibility of forecasting ice appearance, and indicates that the heat loss and amount of heat brought in by the Atlantic flow in the fall-winter period determine the temperature and ice regime of the Barents Sea. The heat losses during the fall-winter period are proportional to the difference of water and air temperatures as they can be calculated without recourse to the heat balance. Since the water temperature varies from year to year much less than the air temperature, the relative losses of heat can be computed only with the aid of the air temperature at the extreme northwest part of the sea. The amount of heat brought in is proportional to the velocity of the warm Atlantic current which depends upon the intensity of the atmospheric circulation over the North Atlantic and Barents Sea. The equation for calculating in advance the mean monthly ice condition of the Barents Sea has the form $\Delta S = (-0.23t - 0.26z^{0.5} + 21.35)k$ where ΔS =anomaly of ice conditions, t =air temperature for September–February at the given station of Barentsburg, z =index characterizing cyclonic activity in September–February over the North Atlantic and the Barents Sea, smoothed for a two year period, and k =coefficient; for the season and April it is equal to 1.8, for May and June 2.0 and for July and August 2.6. The equation for June for pre-computing the mean monthly position of the ice edge is $\Delta\varphi = (0.07t + 0.83s^{0.5} + 75.9)(0.06L - 0.10)$ where $\Delta\varphi$ =deviation (in degrees) of position of the ice edge for the given meridians, t =air temperature (Barentsburg) for September–March, s =ice condition in April, L =longitude where the data s (ice conditions) are lacking, the equation for May is $\Delta\varphi = (0.24t + 0.23z' - 10.8)(0.06L - 0.20)$ where z' =index of cyclonic circulation over the North Atlantic for the given period. Equations for computing the ice edge for May in the absence of ice condition (s), for computing the ice condition in July, etc. are given. *Subject Headings: 1. Sea ice forecasting 2. Sea ice conditions 3. Barents Sea.—I.L.D.*

11.2-87

551.326.8:551.481

Sundberg-Falkenmark, Malin (*Swedish Met. and Hydrol. Inst.*), **Studies on lake-ice movements.** *International Union of Geodesy and Geophysics. Assoc. of Scientific Hydrology*

(*Monio*, Sept. 1957, (*Transactions*), Vol. 4, pub. 1958. p. 266-278. 5 figs., 4 tables, 3 refs. **B, DLC**—The phenomenon that lake-ice is often pushed up the shores of a lake has been explained to be an effect of the refreezing of waterfilled contraction-cracks in the ice, ensuing from the cooling of the upper layers of the ice sheet at low air temperature. The movements observed by **HAMBERG** in 1918, prove to be as much as 50% of the theoretical maximum value. The refreezing of cracks of other origin, too, ought to cause similar ice movements. Investigations in a lake in Middle Sweden, where the daily variations in the water level give rise to cracks along the shore, favor this theory. In the lake in question, however, the movements at all places observed, were directed outwards from the shore. This is explained by the fact that there existed zones of weak ice in the ice sheet. The expansion due to the refreezing of shore cracks, appeared as movements $\perp$ shore, which were largest where the zone of weak ice was most pronounced; these movements were of about the same size year after year. On the other hand, the movements caused by the refreezing of waterfilled contraction-cracks were not very considerable, except in the winter 1953/54 when the snow cover was thin and were only at the observation places where expansion of large parts of the lake was registered. The movements $\parallel$ shore were as a rule smaller than those $\perp$ shore. Finally, it has been possible to obtain an approximate connection between the ice movements $\perp$ shore and the variations in the water level. The movements caused by the refreezing of shore-cracks have thus proved to become larger if these variations are increased. *Subject Heading: 1. Lake ice movement.*—*Author's abstract.*

11.2-88 551.326.8:551.482:627.73
Walter, H. (*Regensburg*), *Erfahrungen in den Eiswintern 1940/41 und 1955/56 auf der deutschen Donau*. [Experience with the ice winters of 1940/41 and 1955/56 on the German Danube.] *Die Wasserwirtschaft*, Stuttgart, 47(9):221-230, June 1957. 14 figs. **DLC**—An account of two winters with the worst ice conditions in recent times. Weather conditions are outlined and fruitless attempts to use artillery and bombs in eliminating ice jams are discussed. Ice breakers are much more effective except during extreme cold. Frazil ice, however, caused difficulties. Fourteen rules to follow during the elimination of ice jams are summarized. *Subject Headings: 1. Ice jams 2. Ice breakers 3. Danube River, Germany.*—*A.A.*

GEOMAGNETISM

See also: Melbourne-Toolangi Magnetic Obs. (Dooley), 11.2-61; Geomag. influence on radioelec. waves (Pecker), 11.2-164; Geomag. research (Roquet, Vassy), 11.2-166; Auroral-magnetic relationships (Abbott), 11.2-294; Auroras and magnetic storms (Hoffmeister, König), 11.2-297.

11.2-89 550.385.41:551.510.536
†Kato, Yoshio and Watanabe, Tomiya (*both, Geophys. Inst., Tohoku Univ.*), *Outer atmosphere and geomagnetic storm*. *Tohoku University, Science Reports, 5th Ser., Geophysics*, (3):119-128, March 1959. 4 figs., 26 refs., 14 eqs. **DWB, DLC**—The existence of the earth's outer atmosphere, in which lines of force of the earth's main magnetic field are frozen, suggests the necessity to improve the Chapman-Ferraro theory of the geomagnetic storm from the view-point of hydromagnetics. The sudden commencement should be described as the contraction of the outer atmospheric matter due to the corpuscular stream. An example is given to picture the main phase as the hydromagnetic rotation of the outer atmospheric matter. The structure of the solar corpuscular stream responsible for the 27-day recurring magnetic disturbance (the M type storm) can be modeled after **PECKER-ROBERTS'** "cone of avoidance" structure, which is favoured by both magnetic and cosmic ray data. The structure of the corpuscles corresponding to the sporadically occurring geomagnetic storm (the S type) will be made clear, if we make a morphological study, taking into account the type of the geomagnetic storm. *Subject Headings: 1. Chapman-Ferraro theory of magnetic storms 2. Outer atmosphere structure.*—*Authors' abstract.* ©

11.2-90 550.385.4
Sugiura, Masahisa and Chapman, Sydney, *A study of the morphology of magnetic storms: Great magnetic storms*. Alaska Univ. Geophysical Institute, Contract AF 19(604)-2163,

Final Report, Aug. 31, 1958. 60 p. 36 figs., 8 tables, 8 refs., eqs.—Average characteristics are determined for 74 great magnetic storms with sudden commencements that occurred in 1902–1945. The storm field is resolved for different epochs of storm time into two parts: (i) Dst, which is independent of local time, that is, of longitude λ , relative to the sun, and (ii) DS, which depends on λ . They are obtained, for each of the three magnetic elements, declination, horizontal force, and vertical force, at eight geomagnetic latitudes ranging from 80°N to 1°S. DS is harmonically analyzed; the first harmonic component is shown to be the main component of DS. The stormtime course of this component is compared with that of Dst; DS attains its maximum earlier and decays more rapidly. The results of the analysis of great storms are compared with those for weak and moderate storms that were reported previously. Some characteristics of Dst change with intensity. Except in magnitude, main characteristics of DS are independent of intensity. *Subject Heading: 1. Magnetic storm morphology.* I. Alaska Univ. Geophysical Institute II. Contract AF 19(604)-2163.—Authors' abstract.

11.2-91

551.557.3:550.386.6

Woodbridge, David D. and Davis, William C., **Geomagnetic relationship to upper wind systems (a possible solar-weather relationship)**. U. S. Army Ballistic Missile Agency, Redstone Arsenal, Alabama, *DV Technical Note*, 68-58, July 30, 1958. 9 p. 15 figs., 9 refs. DWB (M57.3 U581ge)—There are definite 3 and 4-day effects indicating relationship between geomagnetic activity and subsequent development of upper level troughs. This is shown by averaging the last year's results with those of 1957–1958. Fluctuation in the geomagnetic index is a function of solar corpuscular streams reaching the outer atmosphere and manifest in such phenomena as geomagnetic and ionospheric disturbances, aurora, etc. Explanation of the mechanism may well be increased electron density. Frequency variation of great magnetic storms (1878–1952), the trough index, and several presentations of troughs are given in graphs. *Subject Headings: 1. Geomagnetic-upper air wind relationships 2. Upper level trough development 3. Solar-weather relationships.*—W.N.

SEISMOLOGY

See: **Microseisms, Baguio** (Deppermann), 11.2-189; **Microseisms, Bermuda** (Carder), 11.2-192; **Microseisms, Brisbane** (Upton), 11.2-194.

AERONAUTICAL METEOROLOGY

See also: **Use of altitude recorders in gliding** (Krieg), 11.2-144; **Radiation fog effects on visibility** (Evans et al.), 11.2-240.

11.2-92

551.594:629.135.15

Zielinski, J., **Protection d'un planeur contre les effets du coup de foudre et de l'électricité atmosphérique**. [Protection of sailplanes against the effects of thunderbolts and atmospheric electricity]. *Schweizer Aero-Revue*, Berne, 34(9):599–602, Sept. 1959. 12 figs. DLC—Statement of research made by the Laboratory of High Voltage of the Polytechnic School at Warsaw, in order to choose the suitable safety devices against the effects of atmospheric electricity and even of thunderbolts of sailplanes. Author makes a study on the increase of voltage in the cockpit of the sailplane and shows that installing discharge conductors on some salient spots of the sailplane is sufficient for protecting other parts. This safety-device eliminates muscular contraction during flight in thunderclouds, and the loss during a thunderbolt, owing to physical causes, of the ability to steer the sailplane. Efficacy of screening the sailplane against electromagnetic surges depends highly on the number of discharge conductors, and the danger threatening the pilot is directly influenced by his bodily resistance. *Subject Headings: 1. Atmospheric electricity 2. Thunderbolts 3. Sailplanes protection.*—A.V.

11.2-93

551.507.352:551.558.21:551.557.2:551.576.12

Georgii, W. (Munich), **Forschungsflüge in alpinen Wellenströmung**. [Reconnaissance flights in the lee waves of the Alps.] *Schweizer Aero-Revue*, Berne, 33(6):307–314, June 1958.

figs. **DLC**—Flights of jet planes revealed the existence of ascending wave motions of about 10 m/sec, at an altitude of 900 m, north of the Alps, between Inn and Lake Constance. A föhn effect was disclosed over the Tauern Mountains, by S.E. wind, i.e., in continental air. The wave cloud was situated at a high altitude and had a base at about 7000 m. Over Innsbruck, however, the föhn wave motion presents a thoroughly different aspect. The waves appear to be 10 km wide, a value corresponding to the width of the Inn Valley. The cumulus develops at a very high level and changes into wave clouds in their upper part. The article shows an interesting illustration of the thermal layer of the jet stream of Dec. 10, 1954 and confirms the desire of Switzerland and Austria to cooperate so that jet planes can continue the investigation of wave motion from the point of view of transportation by jet propelled aircraft. *Subject Headings*: 1. Lee waves 2. Wave clouds 3. Föhn winds 4. Jet stream 5. Inn Valley, Austria.—A.V.

11.2-94

629.135.1:551.511

Wills, Philip, **Cross Channel glide**. *Shell Aviation News*, London, Paris, No. 233:5-7, Nov. 1957. 2 photos, 2 figs. **DWB**—Account of a 145 mi glider flight in thermal conditions, made by the author from Dunstable (England) to St. Omer (France) on Sept. 15, 1957 in his Skylark 3. The pilot intended to test, near the British coast, the theory that about the month of September one might find up-currents persisting out over the Channel. Down-currents obstructed his return to the British coast and made him decide to cross the Channel towards France. *Subject Headings*: 1. Gliding 2. Mechanics and thermodynamics of the atmosphere.—A.V.

AGRICULTURAL METEOROLOGY

See also: **Training course in agromet.** (Arléry), 11.2-28; **Agromet. services, U.S.S.R.** (Kulik), 11.2-57; **Agromet. conf., U.S.S.R.** (Rudnev), 11.2-59; **Heat and water budget effects on plants** (Hesse), 11.2-282; **Bibliog. of Outstanding Textbooks and Technical Books of Past Decade**, p. 265.

11.2-95

551.586:551.521.16:633.16:581.14

Grahl, A. and Thielebein, M., **Einfluss von Licht auf die Keimung der Gerste**. [Influence of light on germination of barley.] *Die Naturwissenschaften*, Berlin, 46(9):336-337, May 1959. fig., 6 refs. **DLC**—Winter barley "Mahndorfer" germinates without light and this is well marked during the vegetative rest and some time after it. The article gives a description of the different experiments made by the authors on morphological ripe winter barley of the "Mahndorfer" variety. *Subject Headings*: 1. Winter barley culture 2. Light effects on barley germination 3. Barley cultivation.—A.V.

11.2-96

551.586:551.521.16:635.55

Harrington, J. F. (Dept. of Vegetable Crops, Univ. of Calif.); Verkerk, K. and Doorenbos, J. (Lab. for Vegetable Breeding, Agric. Univ., Wageningen), **Interaction of vernalization, photoperiod and light intensity in floral initiation of endive**. *Netherlands Journal of Agricultural Science*, Wageningen, 7(1):68-74, Feb. 1959. 4 tables, 8 refs. Summary p. 68. **A**—Endive (*Cichorium endivia* L.) variety Fullheart No. 5 was grown under various environmental conditions to study their effect on initiation of generative growth. Vernalization of the germinating seed or of young plants hastened floral initiation but at the expense of vegetative growth. Once vernalization has taken place, high temperature promotes bolting. Long photoperiods hasten bolting in both vernalized and unvernallized plants. A 16-hour natural day is less effective than 8 hours of daylight followed by 8 hours of incandescent light. A limited period of short day directly after vernalization promotes floral initiation, especially when insufficient amounts of low temperature have been supplied. Growing the plants under long light shortened the time to floral initiation but, in contrast to the effect of vernalization and long day, it simultaneously promoted vegetative growth. *Subject Headings*: 1. Endive cultivation 2. Vernalization 3. Photoperiodism 4. Light intensity effects on endive.—Authors' abstract.

11.2-97

551.586:63

Pintér, László, *Einfluss der meteorologischen Faktoren auf die Ernteergebnisse der wichtigsten Ackerpflanzen*. [Influence of meteorological factors on yields of the most important field crops.] *Angewandte Meteorologie*, 3(3):77-92, April 1958. 12 figs., 4 tables. **DLC**—The correlation between the individual meteorological elements of atmospheric temperature, duration of sunshine and amount of precipitation and the yield of wheat, maize, rye, oats, potatoes and sugar beets was investigated in the Pest district (Hungary) on the basis of data for 1920-1954. The meteorological data were worked up in pentads but correlations were computed on the basis of five day smoothed decadal values. Sign correlations between yield and the various meteorological elements were carried out to determine critical time periods between each element and the yield; the value is $R > 0.3$. Multiple correlation equations and correlations are presented for the yields of wheat, maize and rye as they relate to air temperature, sunshine and precipitation. For wheat the correlation is $R = 0.9398 \pm 0.016$; for maize, $R = 0.901 \pm 0.023$; and for rye, $R = 0.757$. The application of the multiple correlation equations to estimating harvests (phenological data must be taken into account), to regional cultivation of wheat, maize and rye, to plant breeding and regional agricultural techniques, and to raising the production level are discussed. *Subject Headings*: 1. Climate and crop yield 2. Hungary.—I.L.D.

11.2-98

551.579.5:551.525.4

Suzuki, S. (*Met. Training School, J. M. A., Kashiwa*), *A method of measuring actual amount rate of percolation, specific heat and heat conductivity of soil*. *Geophysical Magazine*, Tokyo, 28(4):499-503, Sept. 1958. table, 3 refs., 11 eqs. **DWB, DLC**—The soil temperature of a paddy field varies with time and depth as $\theta = \theta_0 e^{-az} \sin \left(\frac{2\pi}{T} t + bz \right)$, when the surface temperature is oscillating like this $\theta = 0 = \theta_0 \sin \left(\frac{2\pi}{T} t \right)$ where $a = \sqrt{\frac{\pi pc}{Tk}} - \frac{v}{2k}$ provided the rate of percolation v is low enough. The notations here used have the usual meaning. By measuring a and v , the specific heat by volume pc and thermal conductivity k can be measured or reversely v is obtainable by evaluating pc and k by use of physical constants and the measured soil density p . *Subject Headings*: 1. Paddy temperatures 2. Soil heat conductivity measurement techniques 3. Percolation 4. Japan.—*Author's abstract*.

11.2-99

551.577:631.2

*Thomas, Gerald W. and Hildreth, R. J., *Farming and ranching risk as influenced by rainfall*, No. 11, *Edwards Plateau and Trans-Pecos. Texas. Agricultural Experiment Station, Miscellaneous Publication*, No. 216, July 1957. 39 p. numerous figs., table, 10 refs. **DWB** (M:63 T456fa)—Success in west Texas farming depends on a thorough knowledge of rainfall conditions and the judicious application of such knowledge by the farmers and ranchmen. The past annual rainfall records of many of the Plateau cities are compared with the present seasonal distribution data, in order to assist every farmer in west Texas to really understand the relationship of rainfall to farming projects. *Subject Headings*: 1. Rainfall requirements 2. Agricultural meteorology 3. Ranching climates 4. Texas.—N.N.

11.2-100

551.524:635.3

McGuire, J. K. (*Northeast Area Climatologist, U. S. W. B., New York*), *Weather and cauliflower on Long Island*. *U. S. Weather Bureau, Weekly Weather and Crop Bulletin*, 43(33):7-8, Aug. 13, 1956. map, 2 tables. **DWB, DLC, DA**—Greater New York City with its 13 million inhabitants is still supplied with some cauliflower grown locally on Long Island. Cauliflower is a hearty plant and will generally recover from temperatures as low as 15° to 20°F if cold nights are followed by daytime thawing. If harvest is delayed beyond the critical level of 20°F , a loss of most of the crop may occur. Strong winds are dangerous with a minimum of 20° . Antecedent temperature conditions constitute a significant factor. Cauliflower grows best where cold weather comes late. *Subject Headings*: 1. Temperature effects on cauliflower 2. Cauliflower cultivation 3. Long Island, N. Y.—N.N.

11.2-101

551.586:633.491:632.4

Raeuber, A., *Kritische Tage und Krautfäuleauftreten an Kartoffeln in England und Mecklenburg 1950 bis 1955*. [Critical days and the appearance of potato blight in England and Mecklenburg in 1950-1955.] *Angewandte Meteorologie*, 3(2):47-51, 1957. fig., 8 refs.

—C—Apparent geographical differences in the climatic conditions favoring the appearance of potato blight, even though it is assumed that the environmental needs of this fungus are constant, are discussed. In order to determine the actual climatic conditions favorable to the manifestation of potato blight the author, following the procedure of LARGE, examined critical days for potato blight outbreaks in Mecklenburg for a series of individual years from 1950-1955, and compares them with the results of LARGE in England (*Plant Pathology*, 2:1-15, 1953). In both England and Mecklenburg the dominating role of large scale weather is evident. Cyclonic weather situation is favorable to potato blight outbreaks even though other weather situations such as radiation weather, which favors dew appearance, are very suited to phytophthora outbreaks. The sequence and character of critical days and the beginning of blight outbreaks are similar in both regions since both are subject to the same weather situations in the summer. The roles of synoptic and local weather conditions in establishing an international potato blight warning network are discussed. *Subject Headings*: 1. Potato blight weather 2. Potato blight warning service 3. England 4. Mecklenburg, Germany.—I.L.D.

FOREST METEOROLOGY AND FIRE WEATHER

See also: Forest fire control (Davis), 11.2-5.

11.2-102

551.579:551.588.6(494)

Penman, H. L. (*Rothamsted Experimental Station*), *Notes on the water balance of the Sperbelgraben and Rappengraben*. Switzerland. *Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):99-109, 1959. 6 figs., 8 tables, 6 refs. German, French and Italian summaries p. 108-109.—Hydrological research has been carried on for a long time in the drainage basins of the Sperbel-Rappengraben. Author gives the results a critical examination. For this purpose, he admits that:

$$(N-A)_S \approx V_S \approx \text{constant (Sperbelgraben)}$$

$$(N-A)_R \approx V_R \approx \text{constant (Rappengraben)},$$

where N =rain; A =runoff and V =water balance. When equalizing the comparison scales, the notes agreement in the results of observations made in the two drainage basins. Author arrives at the conclusion that the yearly values of V are comparatively high with regard to observations made in France, America and Great Britain. *Subject Headings*: 1. Forest hydrology 2. Forest water balance 3. Sperbelgraben-Rappengraben, Switzerland. 4. V.

11.2-103

551.579:551.573:551.588.6(494.245)

Wagenhoff, A. and von Wedel, K., *Vergleich der bisherigen Ergebnisse der Untersuchungen über den Wasserhaushalt und den Bodenabtrag im Harz mit den langfristigen Beobachtungen im Emmental in der Schweiz*. [Preliminary results from an investigation of the water economy and soil erosion in the Harz Mountains as compared to long term observations in the Emme Valley, Switzerland.] *Switzerland. Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):127-138, 1959. fig., 2 photos, table, 2 refs. French, Italian and English summaries p. 137-138.—The authors discuss results of the first five years of investigation of water economy and soil erosion in the Harz Mountains. The study area consists of two watersheds, one having 98% forest cover (Wintertal), the other being clear-cut prior to investigation (Lange Bramke). Results confirm, to some extent, previous findings with respect to runoff and evaporation. Observations referring to the occurrence of high- and low-temperature differ from those made in the Emme Valley. *Subject Headings*: 1. Forest meteorology 2. Forest influences on runoff and evaporation 3. Water balance and soil erosion 4. Emme Valley, Switzerland.—Authors' abstract.

11.2-104

551.579:551.588.6

Wicht, C. L. (*University of Stellenbosch, Union of South Africa*), **Planning of catchment-management experiments in forest hydrological research with reference to Southern Africa and Switzerland.** *Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):139-150, 1959. 2 figs., 3 tables, 16 refs. German, French and Italian summaries p. 148-149.—The basic principles underlying the planning of catchment-management experiments on small independent catchments in forest hydrological research are formulated. The selection of forestry, and optional treatments, is considered and the main types of experimental design are described and discussed. The requirements for statistical efficiency are stated and the application of the analysis of variance to such experiments is briefly set forth. The value of these experiments is stressed and it is recommended that their use should be further extended. *Subject Headings:* 1. Forest hydrology 2. South Africa.—*Author's abstract.*

11.2-105

551.521:551.588.6:551.577.2

†Miller, David H. (*Dept. of Geog. and Geology, Univ. of Georgia, Athens*), **Transmission of insolation through Pine forest canopy, as it affects the melting of snow.** *Switzerland. Schweizerische Anstalt f. das Forstliche Versuchswesen, Mitteilungen*, 35(1):57-79, 1959. 2 figs., tables, 59 refs. German, French, and Spanish summaries p. 76-77. DWB (M(055) S413mi)—The hydrologic process of snow melting and evaporation is best understood when air temperature and the heat-balance process of the system is considered as a function of the whole. The author has used specific examples of some observations of insolation transmitted through pine crowns in mountains of California and Montana to explain the above hypothesis. He gives the implications of insolation transmission for the climatology and hydrology of a forested region. The report gives the melting rates of snow in the forest and open areas of the Sierra Nevada during the period of clear anticyclonic weather in spring as well as a list of problems and suggestions. Forest parameters considered are crown depth and stem density, and meteorological parameters insolation absorbed by snow, long wave loss from snow to sky and foliage, heat convection from air to snow, and heat loss by evaporation. Total heat surplus in pine stands was 165 cal/cm² per day and in open snow fields 220 cal. *Subject Headings:* 1. Evaporative cooling 2. Forest effects on snow melt 3. Insolation.—*N.N. and M.R.*

11.2-106

551.584.41

551.588.6:551.577.2

Friedrich, W., **Der Einfluss des Waldes und des Kahlschlages auf den Abflussvorgang in den Wasserhaushalt und den Bodenabtrag: Gebietsniederschläge.** [Effect of forests and clear cut areas on streamflow and water yield, water balance and erosion: Areal precipitation.] *Aus dem Walde*, Hannover, No. 3:63-75, 1958. 4 figs., 4 tables, refs. English summary p. 216. DA—The areal precipitation was calculated for each day of the 5 years of observation (1949-1953) in Wintertal, Lange Bramke, Dicke Bramke, Steile Bramke, Saukappenquell and Quelle Steile Bramke. Tables present the month to month values, winter, summer and year to year values of precipitation. The calculation was made on the basis of rain gage measurements of 2 standard rain gages and 16 rain storing gages (totalizers). Diagrams and figures of the instruments are presented. On the cleared Lange Bramke watershed the annual mean precipitation was 1223 mm as compared with 1254 mm on the Wintertal watershed. Thus both experiment areas received practically the same amount of precipitation. During the period of observation the precipitation was lower than the annual mean precipitation recorded by the Clausthal weather station over a longer period of years. *Subject Headings:* 1. Forest climatology 2. Forest influences on precipitation 3. Forest clear cutting effects.—*Author's abstract.*

11.2-107

551.584.41

551.588.6:551.579.1/

Friedrich, W., **Der Einfluss des Waldes und des Kahlschlages auf den Abflussvorgang in den Wasserhaushalt und den Bodenabtrag: Abflussvorgang.** [Effect of forests and clear cut areas on streamflow and water yield, water balance and erosion: Streamflow and water yield.] *Aus dem Walde*, Hannover, No. 3:108-123, 1958. 14 figs., 2 tables, refs. English summary p. 217-218. DA, DWB—Experiments were made on streamflow and water yield in several areas of the Upper Harz mountains. Since the experiment areas are relatively small, the average streamflow is small too. For the years 1949-1953 the average streamflow was: Lange

Bramke: 16.8 liter/sec.; Wintertalbach: 18.7 l/sec; Dicke Bramke: 6.9 l/sec (average figure for 1952 and 1953); Steile Bramke: 8.7 l/sec (average figure for 1951, 1952 and 1953). The average water yield amounted to Lange Bramke (clearing): 22.3 l/sec/km²; Wintertalbach (forest cover): 21.5 l/sec/km²; Dicke Bramke (forest cover): 21.4 l/sec/km²; Steile Bramke (forest cover): 23.2 l/sec/km². Since only for the Lange Bramke and the Wintertal are measurements of all 5 years from 1949–1953 available, only these two areas can be compared with each other. The clearing has a higher average water yield per annum than the forest-covered area. This is the result of the high water yield on the cleared watershed during summer. On the other hand during winter the water yield of the forest-covered watershed is slightly higher than the water yield of the cleared watershed, due to the relatively high water storage under forest cover. The annual distribution of the water yield shows the differences between forest cover and clearing. Furthermore, the measurements revealed a characteristic daily distribution of water yield which is explained as the result of the daily changes in evaporation. *Subject Headings:* 1. Forest climatology 2. Forest hydrology 3. Forest influences on water balance 4. Forest clear cutting effects 5. Runoff and erosion 6. Harz Mts., Germany. *Author's abstract.*

11.2-108 551.584.41 551.588.6:551.577.2:551.579.1
Friedrich, W., *Der Einfluss des Waldes und des Kahlschlages auf den Abflussvorgang, den Wasserhaushalt und den Bodenabtrag: Hochwässer.* [Effect of forests and clear cut areas on streamflow and water yield, water balance and erosion: Floods.] *Aus dem Walde*, Hannover, No. 3:175–184, 1958. 4 figs., refs. English summary p. 218–219. DA, DWB—Investigations were made on floods in the forest covered Wintertal valley and in clear cut areas of the Upper Harz Mts. A clear relationship between peak magnitudes and frequencies of the clear cut area was not found. Under equal conditions in some cases the highest flood peaks occurred on the clear cut area, in others under the forest cover. The flood peaks from the forest-covered areas are especially high during winter when thaw periods are followed by rainfall. In such cases the clear cut area may already be free from snow whereas under the forest cover the remnants of the water-saturated snow runs off along with the additional rain. During the summer the magnitude and frequency for flood peaks in the spruce forests is considerably reduced due to the high interception and the large capacity for soil water storage. *Subject Headings:* 1. Forest climatology 2. Forest influences on runoff 3. Forest clear cutting effects 4. Upper Harz Mts., Germany.—*Author's abstract.*

11.2-109 551.584.41 551.588.6:551.577.38:551.579
Friedrich, W., *Der Einfluss des Waldes und des Kahlschlages auf den Abflussvorgang, den Wasserhaushalt und den Bodenabtrag: Niedrigwasser und Trockenwetterabfluss.* [Effect of forests and clear cut areas on streamflow and water yield, water balance and erosion: Low water and streamflow during draught periods.] *Aus dem Walde*, Hannover, No. 3:185–191, 1958. 2 figs., table, refs. English summary p. 219. DA, DWB—During the months from January to May the low water and the stream flow during drought periods are higher in the forest-covered Wintertal than in the clear cut area Lange Bramke (Upper Harz Mts.). During the summer months, due to the high water consumption of the trees, this gradually changes, and from August onwards, during drought periods, the forest yields less water than the clear cut area. When the natural replacement of the stored soil water was delayed, the unfavorable water yield of the forest-covered area lasted up to December. *Subject Headings:* 1. Forest climatology 2. Forest hydrology 3. Forest influences on water balance 4. Forest clear cutting effects 5. Drought periods 6. Upper Harz Mts., Germany.—*Author's abstract.*

11.2-110 551.579:551.588.6
Nys, L. (*Ecole des Hautes Etudes Commerciales et Consulaires de Liège*), *Remarques sur l'effet hydrologique d'une coupe à blanc.* [Remarks on the investigation of hydrologic effects of clearings.] *Switzerland. Anstalt für das Forstliche Versuchswesen Mitteilungen*, 35(1)-81-92, 1959. 2 refs. German, Italian and English summaries.—This article discusses the results of a hydrologic five year study performed in two valleys of the Upper Hartz Mts. (Germany). The valley is completely stocked with spruce, whereas in the other valley the forest was clear cut at the start of the investigation. The measured differences in the runoff of the two valleys

are explained as caused by clear cutting, by natural factors which modify meteorologic conditions (although the valleys are located close to each other), and by the inevitable imperfection of measuring. Author states opinion that the denuded soil has preserved over the five years many properties of a forest soil. *Subject Headings:* 1. Forest hydrology 2. Forest influence on runoff 3. Forest clear cutting effects 4. Upper Harz Mts., Germany.—*Author's abstract*

11.2-111

551.579:551.588.6(494.245

Meyer, Karl Alfons, *Über Wald- und Wasserprobleme von ältesten Sickerungen zu vollen Strom*. [Development of the knowledge concerning forest-water relationships. Switzerland. *Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):159-178, 1955] French, Italian and English summaries p. 177-178. Using historical and literary sources from Greek mythology through Roman culture to modern times, the author shows in the first part of the paper how the relationship between forest and water occupied man's mind during the ages, and how finally the desire developed to investigate this relationship scientifically. The second part consists of a detailed description of the establishment and development of the water measurement stations in the Emme Valley. *Subject Headings:* 1. Forest hydrology 2. Hydrologic stations 3. Emme Valley, Switzerland.—*Author's abstract*.

11.2-112

551.524:551.571:632.18

*Kashin, K. I. and Gritsenko, M. V., *Sviaz' temperaturey vozdukh s defitsitom vlazhnosti*. [The relationship of air temperature to moisture deficit.] *Meteorologiya i Gidrologiya*, Leningrad, No. 5:29-33, 1958. fig., 3 tables, 4 refs. DWB, DLC—The relationship between moisture deficit and temperature at 1300 hours was investigated for a number of points in the U.S.S.R. for each month in order to determine seasonal differences so as to facilitate forecasting of forest combustibility. Continental stations showed a more or less similar relationship for these elements every month so that it is actually possible to construct a general graph relating moisture deficit with temperature by month for all continental points. Graph for 29 points in the U.S.S.R. for a five year period, from August to October, showed that the character of the relationship and the scatter of points are essentially the same for any locality considered. Differences in the relationship by months are explained by the fact that the same temperature is determined in different months by different synoptic conditions. In the case of stations situated along the coasts of different seas the relationship between moisture deficit and temperature differ for the different stations. A comparison of graphs constructed on the basis of continental data and coastal data shows that the same temperature corresponds to lower moisture deficits at the coastal stations. It is impossible to combine all graphs constructed for coastal stations of different seas since there exist essential differences in the curve because of wind direction and synoptic processes. In comparison with continental stations the least difference in moisture deficit at the same temperature is observed at Baltic Sea stations since it varies slightly in all months. Data are presented in tables on the mean moisture deficit during dry days for various air temperatures, difference between moisture deficit at continental and coastal stations for each month from April to October, and mean moisture deficit during dry periods. *Subject Headings:* 1. Temperature-humidity relationship 2. Moisture deficiency 3. Forest combustibility forecasting 4. U.S.S.R.—I.L.D.

11.2-113

551.588.6:551.579.3

Rutkovskii, V. I., *Vlianie lesokhoziaistvennykh meropriiati na stok rek*. [Influence of silvicultural activity on river runoff.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 3:114-126, 1958. 37 refs. DWB—A review of Soviet literature dealing with the problem shows the lack of unanimity on the question of the influence of forest, and, consequently, of silvicultural activity on river runoff. After citing a number of contradictory conclusions drawn by investigators of various river basins, the author asserts that this was caused by the lack of accurate information on changes in the spatial and consistency distribution of forests in the investigated areas, and the fact that climatic and geological-structure differences of river basins were not taken into consideration. He concludes with the assertion that the water regulating role of forests differs depending on concrete geographical conditions of the basin and the influence of other physico-geographical factors upon the runoff. *Subject Headings:* 1. Forest influences on runoff.—A.M.P.

11.2-114 551.513.2:551.43 551.509.58:632.187
 Schroeder, Mark J. (U. S. W. B.) and Coffin, Harry C. (Div. of Forest Fire Research), *Catalina Eddy disrupts weather patterns in the Arroyo Seco*. U. S. Forest Service. California Forest and Range Experiment Station, Forest Research Notes, No. 131, Nov. 21, 1957. 9 p. T. DWB (M09.584 U581 ca)—The weather charts of the Arroyo Seco, Calif. from Aug. through 30, 1956 show some extreme changes. Studies have evidenced the fact that the Catalina Eddy in this region produces a radically different weather pattern wherein the air blows southeast from Point Arguello, then gradually turns toward the east and finally northeast to reach the southern California coast. Occasionally, this pattern does not hold. When the wind follows its normal course fire fighters can generally predict what may happen. But when the extreme weather change becomes unpredictable the wind, temperature, and humidity patterns present a real problem for the fighters. An illustration of this is given on maps for the Catalina Eddy of Aug. 23-28 in different sections of Arroyo Seco. On Aug. 24 the top of the 1000 ft and the height increased each day, reaching 4100 ft on the 27th and 4000 ft on the 28th. Graphs of 0400 temperatures are cited for the reversal weather pattern. Weather forecasters in the Angeles National Forest area are advised to include the beginning of the Catalina Eddy in their fire weather forecasts. *Subject Headings: 1. Orographic effects on circulation 2. Catalina Eddy 3. Fire weather forecasting 4. Arroyo Seco, Calif.—N.N.*

11.2-115 551.5:368.10(794)
 California. Dept. of Natural Resources. Div. of Forestry, *A study of the North forest fire risk index*. Aug. 4, 1953. 7 p. tables. Typescript. DWB (634.96 C153st)—Weather conditions, the determination and evaluation of burning in forests, and other conflagrations are discussed. A fire risk index on the important aspects and characteristics of how, when, and where fires will start, how they will behave once ignited, and how difficult they will be to control is given. Facts herein contained are indexes computed for each of 229 days during the summer fire season in North Coast District 1, for the years 1950 and 1951, and the number and sizes of forest fires in zones 1 and 11 for the same period. *Subject Headings: 1. Fire danger index 2. California.—N.N.*

11.2-116 551.5:632.187(52)
 Koenuma, Kan-ichi, *Fire and weather in Japan in wooden houses*. (Tokyo?), Chizinko-sha, 1957. 169 p. 53 figs., photos, 29 tables. In Japanese (Romanized title: Kasai no yononaka).—Various chapters include the problem of fire and its nature in Japan, causes, conditions for spread (humidity and wind), climate of Japan, fire weather, seasonal fire conditions, conflagrations and weather, long-period fluctuations in number of fires, and prevention of fires. The data are presented in tables and graphs, synoptic charts, etc. *Subject Headings: 1. Fire weather, Japan 2. Japan.—M.R.*

11.2-117 551.584.41:551.588.6
 Ovington, J. D., *Some ecological considerations of forest influences*. Switzerland. Anstalt für das Forstliche Versuchswesen, *Mitteilungen*, 35(1):91-97, 1959. table, 23 refs. German, French and Italian summaries p. 96.—Author explains the influence exerted by forests on microclimate and deals with various problems regarding the water balance: interception of rainfall by the top of trees, evaporation, transpiration, infiltration and runoff at surface. He treats, further, the correlation existing between forest and climate as concerns the water cycle and surface. *Subject Headings: 1. Forest microclimatology 2. Forest influences on water balance.—A.V.*

11.2-118 551.49:551.588.6
 Hornsmann, E., *Vom wachsenden Wert der Wohlfahrtswirkungen der Wälder in Mitteleuropa*. [The increasing importance of the welfare aspects of Central European forests.] Switzerland. Anstalt für das Forstliche Versuchswesen, *Mitteilungen*, 35(1):21-29, 1959. ref. German, Italian and English summaries p. 28-29.—In the Alps the protective effects of forestation were recognized as early as the 14th century and this use of forests took precedence over wood production until recently. This contrasts with the purely economic evaluation of forests in Central Europe's plains around 1900, which gave way to a more correct judgment

only when the known classical forest influence, such as protection against soil erosion by water and wind, were reinforced by the more modern considerations, such as protection from factory fumes, noise and radiation. Increasing importance of forests in water economy and as recreational areas supported this change of opinion which has led to today's demand for optimum balance of both economic and welfare aspects in the use of forests. *Subject Headings:* 1. Forest influences on climate 2. Forest influences on water regime.—*Author's abstract.*

11.2-119

551.49:551.579:551.588

Hursh, Charles R. (*Southeastern Forest Experiment Station, Asheville, N. C.*), *Forest influences in world wide application. Switzerland. Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):31-36, 1959. fig. German, French and Italian summaries p. 35-36. This article shows to what extent the research undertaken during the last decade has contributed for a scientific basis in the problem of forest influence on water balance. By means of numerous examples drawn from the principal continents, author shows the outcome of his research: the drainage of soils saturated with water by means of gum tree plantations, the stabilization of sand-dunes through afforestation, the local improvement of climate resulting from the planting of shelter belts, etc. Other examples show that the problems of water regime regulation and water supply may call for different solutions because of local conditions. According to the nature of the soil or climate, afforestation, thinning out or transformation of existing forests, or clear cutting will be indicated. *Subject Headings:* 1. Forest influences on water balance 2. Forest-climate relationships 3. Forest influences on erosion.—*A. V.*

11.2-120

551.49:627.14:551.588

Kirwald, E., *Die Ordnung des Wasserhaushaltes im Mittelgebirge.* [Watershed management in the Central European Uplands.] *Switzerland. Anstalt für das Forstliche Versuchswesen, Mitteilungen*, 35(1):37-50, 1959. 3 figs., 14 refs. French, Italian and English summaries p. 49.—Using the classical example of the Sperbel-Rappengraben investigations, forest hydrological research has been performed in the Ruhr region. First the principal problems of forest influences on water management are discussed. The second part deals with watershed management and the different points to be considered when reafforestation of a catchment is planned. In many cases constructions are necessary in addition to plantations. The third part, therefore, is devoted to a special type of construction, the so-called "Hockerschwellen" built into the riverbed from huge blocks and boulders. They serve to destroy much of the eroding energy of torrents by friction. *Subject Headings:* 1. Forest-water balance relationship 2. Forest-torrent relationships 3. Ruhr region, Germany.—*Author's abstract.*

MEDICAL METEOROLOGY

See: Elec. field effects on man (Dussert), 11.2-280.

INDUSTRIAL METEOROLOGY

See: Nuclear reactor accidents, 11.2-20; Stack met. (Stewart et al.), 11.2-215.

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: Radio use in ballistic met. (Denisov), 11.2-14; Radar obs. of satellites (Davies et al.), 11.2-76; Satellite storm detection (Singer), 11.2-82; Isoline interpolation (Višnovský), 11.2-151; Radar meteor records (Rao), 11.2-165; Radar echoes (Gordon), 11.2-169; Radar turbulence measurement techniques (Fleisher), 11.2-219.

11.2-121

551.501.45:551.579

Alekseev, G. A., *Opređenje koefitsienta polnogo stoka ot vypavshikh osadkov po gidrografu v zamykaiushchem stvore basseina.* [Determination of the total runoff coefficient from precipitation by means of a hydrograph in a closed basin.] *Meteorologiya i Gidrologiya*

Leningrad, No. 4:15-20, April 1958. fig., ref., 6 eqs. **DWB, DLC**—The interrelationship of runoff processes in adjacent periods, especially during flood and low water, influences the runoff coefficient, since the rainfall losses are determined by the character of the preceding flood, especially by the saturation of the basin both in the upper soil layer and in the ground channel water supply. In this study the author shows that the total runoff coefficient of precipitation can be determined by means of a hydrograph in a closed basin without relating in the hydrograph the flow from initial (ground water) runoff water in the basin during annual and secular flood and low water periods by means of the "general balance". The complete runoff H_0 from precipitation layers H is equal to the total runoff W_{0,t_1} during the time from beginning of flood $t=0$ up to $t=t_1$, when the supply of runoff water in the basin U_{t_1} —varying in time according to $U_t=f(t)$ attains the value $U_{t_1}=U_0$ as in the beginning of the flood at $t=0$, i.e. $H\alpha=\sum_{t=1}^{t=t_1} Q_t=\int_0^{t_1} Qdt=W_{0,t_1}$ where t_1 is determined from $U_t=U_0$. The derivation of this formula as a partial case from the equation of balance of runoff waters in a basin, taking the latter at the time t , when (at the decline of the flood) the reserve of runoff waters in the basin becomes equal to the runoff waters in the initial (pre-flood) period. The use of the balance equation for determining the total runoff layer is discussed for a series of basins, a multi-peak flood, etc. **Subject Headings: 1. Runoff coefficient determination 2. Hydrographs.—I.L.D.**

11.2-122

551.501.45:551.579.4

Rabukhin, L. G., **O normakh rascheta stoka malykh basseinov.** [Standards for calculating the runoff of small basins.] *Meteorologiya i Gidrologiya*, Leningrad, No. 10:50-51, Oct. 1957. ref., eq. **DWB, DLC**—The author points out that the new standards for calculating runoff from small basins introduced in 1956 by the Ministry of Transportation Construction and Ministry of Communications contain various inaccuracies. According to the instructions for calculating runoff, the entire U.S.S.R. is divided into 19 climatic regions for which graphs giving the dependence of water yield as a function of its duration are presented. But individual regions consist occasionally of localities sharply differing in precipitation. The standards do not indicate the stations that constitute the computed graphs. The characteristics of the absorption capacity of the subsoil are not indicated, etc. **Subject Headings: 1. Runoff calculations 2. Runoff errors 3. U.S.S.R.—I.L.D.**

11.2-123

551.501.45:551.577.32

Uttinger, Heinrich, **Über ein bei gleitenden Mittelwerten auftretendes Paradoxon.** [The apparent paradox in moving averages.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 136:97-98, 1956. table. **DWB, DLC**—The annual variation of precipitation in a locality can vary considerably depending upon the period of observation used to calculate the means. This is illustrated by the application of moving averages to the 92 years of rainfall record for Geneva. The mean monthly and annual totals of rainfall were computed for all possible 40 successive years. Data showing the maximum and minimum monthly means calculated by the moving average technique and the mean monthly values for all 92 years are presented; the latter lie in general between the extremes. Theoretically the paradox occurs independently of the relationship between the total length of the river and the moving period. However it occurs in those cases when the moving period is shorter than a third of the total series. It is also very likely to occur in those series in which the individuals are more scattered on one side, as is particularly true of mean monthly precipitation. **Subject Headings: 1. Annual precipitation variations 2. Moving averages 3. Monthly mean precipitation calculation.—I.L.D.**

11.2-124

551.501.724:551.524.2

Shinohara, T., **Errors estimating temperature from neighbouring observations.** *Journal of Meteorological Research*, Tokyo, 10(2):83-87, Feb. 1958. fig., 3 tables, 3 refs. In Japanese, English summary p. 83. **Comments** by E. Suzuki, *Ibid.*, 10(5):453, May 1958. **DWB, DLC**—In this report, the author examined errors of estimating temperature from neighboring observations. The principal features are as follows: 1) Method of estimating temperature at a point from neighboring observing points; 2) Examples of errors of estimating temperature

from neighboring observations, by month; 3) Relation between distance and standard deviation of temperature difference between two stations. *Subject Heading: 1. Temperature estimation errors.—Author's abstract.*

11.2-125

551.501.75:551.1

Farnham, D. L. and Miller, P. H. (both, Atmos. Studies Branch, Instrument Operations Div., Test Dept.), **A method of computing winds aloft using rawinsonde data.** *U. S. Navy Ordnance Test Station, China Lake, Calif., NAVORD Report, 6422; NOTS 2122, Aug. 12, 1959 p. fig. DWB (M(055) U584no)*—A new method of computing upper air winds by use of a new time altitude chart is rapid and accurate, saving about 50% of the time needed for reduction by Gould's method. The pressure value for every 5th reference contact is used for the time altitude curve, rather than one minute intervals, and the plotting data for 1000 levels is eliminated, reducing the number of points from 120 to 18. *Subject Headings: 1. Upper air wind calculation 2. Rawinsonde techniques.—M.R.*

11.2-126

551.501.75:551.557:551.5

Rouaud, A., **Erreur dans la détermination du vecteur vent.** [Error in wind vector determination.] *Journal Scientifique de la Météorologie, Paris, 9(33):1-13, Jan./March 1958, 3 figs., table, 17 eqs. French, English and Spanish summaries p. 1. DLC—Vectorial error inherent in the various aerological methods of wind determination are mathematically analyzed. H is found to be an essential factor required for upper-air wind computation in direct and accurate determination of the distance of the balloon. At high balloon altitudes (as above 15 km) this cannot be adequately done by means of theodolites or radiotheodolites, because of the large value of h (balloon altitude) and the small value of $\sin \phi$ (ϕ = inclination). This fact justifies the use of radar- or transmitter-type equipment in modern aerological networks. Subject Headings: 1. Wind vector calculations 2. Upper air wind vectors.—G.T.*

11.2-127

551.501.774:551.574

Long, I. F., **Some observations on dew.** *Meteorological Magazine, London, 87(1032):10-168, June 1958. 4 figs., table, 8 refs. DWB, DLC*—Some forms of water deposits observed and recorded wrongly as dew vs. "the deposition of water drops by direct condensation of water vapour from the adjacent clear air" are discussed here. Experiments conducted: Rothamsted 1950-1956 in grass and various crops made it possible to determine onset and end of dew to within 5 min. and to estimate the approximate dew intensity. It was confirmed that the temperature of a dry surface must be lower than dew point of the air for condensation of moisture to take place; the temperature of a wetted surface "need only be at the dew point temperature." Rise of leaf temperature to that of dew point of ambient air when condensation occurs was not supported by the records. In absence of an inversion of the vapor pressure gradient above the crop surface, no dew forms. The routine dew observations at 0900 GMT rather show persistence than occurrence of dew which was checked by comparing estimated dew occurrence from continuous records of vapor pressure, humidity and wind gradients with routine meteorological observations at Rothamsted July and Aug. 1956. A rough analysis for the summers 1955 and 1956 showed twice as many dew nights as recorded at 0900 GMT. *Subject Headings: 1. Dew investigations 2. Dew observation.—W.N.*

11.2-128

551.501.777:551.508.77:551.578

Sadvakasov, Iu. B., **Opyt ispol'zovaniia osadkomerov i snegos'emok v 1950 i 1951 gg. dlya opredeleniia godovogo kolichestva osadkov v basseine reki Kzylcha.** [Experience in the use of precipitation gages and snow surveys in 1950 and 1951 to determine the annual precipitation amount in the Kzylcha River basin.] *Tashkent. Geofizicheskaya Observatoriia, Trudy, No. 10(11):164-170, 1954. 6 figs., table, ref. DLC*—An attempt to determine the distribution of snow by altitude zones, and to evaluate the total reserves of snow in the basin at the beginning of the snow-melting period, as well as to find the annual precipitation runoff coefficient was made by means of snow surveys carried out on horizontals with 200 m height intervals at points, mainly in the medium altitude part of the basin between 1600 and 2000 m height (80% of the surveys), as well as by installing precipitation gages mainly (80%) in the zone from

00 to 2800 m altitude. It was found that the quantity of precipitation increases with the height of the locality, and that the vertical gradient of precipitation can be accepted in first approximation as equal at all altitudes. The annual precipitation runoff coefficient was found to be equal to .76 (which is apparently exaggerated). *Subject Headings: 1. Precipitation gages 2. Snow surveys 3. Annual precipitation determination 4. Kzylcha River basin.—A.M.P.*

- 11.2-129 551.501.8:621.396.11 551.510.535:551.510.62
 *Haubert, A., *Sondages radioélectriques par impulsions sous incidence oblique*. [Radio sounding by pulses with oblique incidence.] *Rabat, Morocco. Institut Scientifique Chérifien, Service de Physique du Globe et de Météorologie, Annales*, 18:129-136, 1958. 7 figs., 9 eqs.
 *C—In soundings through vertical impulses, synchronization of sweeping the cathode tube with emission rhythm of impulses is easy to get, emission and reception taking place at the same spot. In the case of oblique soundings, emitter and receiver being sometimes located at considerable distances from each other, it is necessary, in order to get this synchronization, to use quartz-clocks. Author describes the method of measuring delays in reception of echoes produced from the same impulse. Differences in delays must be expressed in differences of distance covered. For calculation, graphs have been established for 2 different types of electric wave propagation. In the instance of propagation in the form of broken lines, through successive reflections between ground and ionosphere, earth and ionosphere are assumed to be flat for short distances. For great distances, their curvature must be taken into account. In propagation with refraction in the ionized regions, one considers a law of ionization variation with altitude. *Subject Headings: 1. Radio sounding 2. Electric wave 3. Ionospheric propagation 4. Oblique incidence propagation.—A.V.*

OBSERVATIONAL DATA

See also: Flood frequency data, W. Washington (Bodhaine, Robinson), 11.2-18; World weather charts (Dzerdzeevskii), 11.2-27; Soviet participation in IGY, 11.2-37; IGY meteor program (van Woerden), 11.2-38; IGY data center (Nikolaev), 11.2-40; IGY ionospheric program (Lazarus), 11.2-47; IGY atmos. optics program (Weill), 11.2-48; IGY rocket and satellite program (Porter), 11.2-81; River ice data, Canada, 11.2-85.

- 11.2-130 551.506.1:551.524.37(522.7)
 *Shinagawa, S., *Statistical researches on the dates of first frost and last frost in Kagoshima Prefecture*. *Journal of Meteorological Research*, Tokyo, 9(8):602-604, Aug. 1957. 4 figs., 4 tables. In Japanese. DWB—Statistical data of inclusive dates of frost and minimum air temperature during frost period of 12 locations and Kagoshima District observatory from 1945-1955 are tabulated, and minimum air temperature distribution charts of Kagoshima Pref. are presented. The conditions of barometric pressure distribution and air temperature drop during frost period are examined. *Subject Headings: 1. Frost probability dates 2. Frost duration data 3. Kagoshima Prefecture, Japan.—J.H.W.*

- 11.2-131 551.506.1:551.582.2(899)
 *Battione Chiarino, J. A., *Resumen mensual de los valores meteorológicos correspondientes al Observatorio del Prado, (período 1901-1950)*. [Summary of climatic values for Prado Observatory, 1901-1950.] *Revista Meteorológica*, Montevideo, 14(50/51):29-54, June/Dec. 1956. DPU—Monthly mean, maximum and minimum values of temperature (in the shelter, at the ground, at 1.5 m, wet-bulb temps.), humidity, evaporation, sunshine duration, cloudiness, precipitation and pressure are listed for each month and season and for the year for Prado Observatory on the basis of the period 1901-1950. *Subject Headings: 1. Monthly climatic summaries 2. Prado Observatory, Uruguay.—G.T.*

- 11.2-132 551.506.1(569.3)
 *Lebanon. Service de Climatologie, *Bulletin Climatologique Mensuel* [Monthly climatological bulletin], ed. by the Observatoire de Ksara, Beirut, Lebanon. No. 5, January 1956—No. 4, Dec. 1956. Monthly. Paged continuously throughout year (about 20 p. each). Added t.-p. in Arabic. Text in French and Arabic. Almost entirely tables. DWB—Con-

tains a general summary of weather conditions for the month and synoptic events for each period during the month, total global radiation at Ksara and daily humidity values (on graphs) for 5 stations. Data tables give usual climatic values for the month for 47 stations arranged by climatic zones, and daily precipitation for 92 stations, wind direction, and speed frequency and cloudiness for 11 stations, daily prevailing wind direction and speed for 12 stations, mean daily temperature, pressure, precipitation and wind for 1-5 stations. *Subject Headings: Monthly meteorological data summaries 2. Lebanon 3. Arabic language.—M.R.*

INSTRUMENT CARRIERS

See also: Soviet artificial satellites, 11.2-35; Soviet satellite measurements, 11.2-75; Radar obs. of Soviet satellites (Davies et al.), 11.2-76; Satellite launching (Hagen), 11.2-77; Rocket obs. of upper atmos. (Janicki), 11.2-78; Satellite cosmic ray recorders (Ludwig), 11.2-79; Satellite obs. of upper atmos. (Paetzold), 11.2-80; IGY rocket and satellite program (Porter), 11.2-81; Satellite storm detection (Singer), 11.2-82; Satellite uses, 11.2-83; Reconnaissance flights in lee waves (Georgii), 11.2-93; Cloud seeding from rockets (Brazell, Taylor), 11.2-159.

11.2-133

551.507.2:551.508.824

Brocks, Karl (*Geophysikalisches Inst. der Univ. Hamburg*), *Ein neues Gerät für störungsfreie meteorologische Messungen auf dem Meer*. [A new device for undisturbed meteorological measurements at sea.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, Vienna, 11 (2):227-239, 1959. 8 figs., 3 refs. German, English and French summaries p. 227-228. **DWB, DLC**—The importance of undisturbed meteorological observations on the open sea is discussed and the requirements for an adequate instrument buoy are specified. The constructive solution is as follows: a floater 2.5 m high, approximately elliptical cross section (longer axis of the cross section at all heights 1.5 m, transverse axis on the surface 1 m, below 0.5 m) with a stabilizing weight of 500 kg, movable (to 7.5 m draught), guiding fins, damping plates, and windlass for hoisting the weight; mast of aluminium 9 m long, with horizontal spars on which the instruments are fixed. Characteristic period of the apparatus about 10 sec. It was used (in the German Bight and in the Baltic Sea) at various times for several weeks up to wind-force 6 for measuring wind, temperature, and humidity distributions in the maritime boundary layer of the atmosphere and it showed maximum oscillations of the mast of 10° and vertical movements of ± 25 cm, following well the wave motion even with short waves. The instrument buoy is trailed by the research ship, measurements are carried out (by cable) in drifting while the buoy places itself automatically on the windward side of the ship (at a distance of about 50 m). In this way undisturbed measurements were obtained. Examples are communicated showing the influence of the wind on the drifting velocity of the system research ship—instrument buoy (relative to the water surface) and the difference of wind velocity at the same height at the ship and the buoy (from which the disturbing influence of the ship can be seen). A characteristic quarter-hour profile of wind velocity, air temperature, and air humidity between the levels 0.8 m and 16 m above water is given. *Subject Headings: 1. Buoy weather stations.—Author's abstract.*

11.2-134

621.396.6:551.507.321.2/362.1 523.16

Eckhardt, D., *Un équipement de télémessure pour fusée ou ballonsonde*. [Telemetering equipment for rockets or sounding balloons.] *L'Onde Electrique*, Paris, 39 (388/389):660-664, July/Aug. 1959. 9 figs., 5 refs. **DLC**—This article describes a system of remote measurement using 210 Mc/s and arranged to transmit information from measuring apparatus installed in a rocket or in a sounding balloon. The system comprises a transmitter, which is modulated by information from the measuring apparatus and powered by a voltage converter working from 6-volt batteries; a transmitting antenna or a rocket antenna formed by part of the body of the rocket; and the reception apparatus which uses a helical antenna and a commercial receiver. Two examples of the measuring apparatus are described, of which one is for measuring the global intensity of cosmic rays with the aid of a Geiger-Muller counter. *Subject Headings: 1. Rocket telemetering equipment 2. Sounding balloons 3. Telemetering equipment 4. Global cosmic ray intensities.—Author's abstract. ⑤*

11.2-135 551.507.321.2
 †Rink, J., **Der plastische Ballon, ein neues Hilfsmittel zur Untersuchung der oberen Atmosphäre.** [Plastic balloons, a new aid in upper atmosphere research.] *Zeitschrift für Meteorologie*, Berlin, 11(12):371-376, Dec. 1957. 4 figs., 24 refs. DWB, DLC—The author reviews the history of the development of balloons capable of rising above 30 km; 26 physical requirements of such balloons are listed. This is followed by an account of the balloons developed in the middle of the thirties by REGENER and JOHNSON who used plastic material instead of rubber to construct stratospheric balloons, the use of copper oxide "Cuprophane" in Germany, the stratospheric balloons developed in Japan during the war, and the propylene-rubber balloons developed in the U. S. The mechanism whereby the balloon maintains a constant level is described. The characteristics and advantages of transonsonde balloons, their use in high atmosphere studies, such as the study on the velocity and variation of trough structures, cosmic rays, etc., the attainment of manned balloons high altitude levels, the efficiency and cost of such balloons, etc. are discussed. *Subject Heading: 1. Plastic balloons. I.L.D.*

11.2-136 551.507.321.2
 Smith, J. R., **Project Skyhook.** Raven Industries, Inc., Sioux Fall, S. Dakota, Contract Monr 2358(00), Report, May 1, 1957-April 30, 1958, issued May 1, 1958. 7 p. 9 figs. (incl. photos), 6 charts and 2 maps (all fold.). DWB (M07.321.2 R253pr)—Project Skyhook engaged the Raven Industries to collect flight data at altitude above 12,000 ft using 6 special balloons designed to have minimum weight. This report summarizes the results of the various first flights on altitude maintenance, duration control, altitude measurement, positioning during flight, and recovery and air traffic safety. A time altitude curve has been drawn. *Subject Headings: 1. Balloon flight observations 2. Skyhook balloons.—N.N.*

11.2-137 551.507.352:551.508.953:551.521.18
 Houghton, J. T.; Moss, T. S.; Seeley, J. S. et al., **Some observations of the infra-red solar spectrum from a high-flying aircraft.** *Nature*, London, 180(4596):1187-1188, Nov. 30, 1957. fig. DWB—Strong absorption bands of water vapor and CO₂ in infrared obscure much of the solar spectrum from the ground. A spectrometer and heliostat were installed in an aircraft. Successful ascents were made at 1.8 to 2.1 μ to 45,000 ft. The amount of water vapor in a vertical column of air above 45,000 ft at Farnborough in August would be about 5% of precipitable water. *Subject Headings: 1. Infrared solar spectra observation 2. Airplane infrared spectrometers. I. Hawkins, T. D. F.—C.E.P.B.*

11.2-138 629.136.1:551.507.361/362
 Jackson, S. B. (*Irving Air Chute of Gt. Britain, Ltd.*), **Parachute recovery of guided missiles.** *Shell Aviation News*, London, Paris, No. 245:18-20, Nov. 1958. 2 figs. Texts in English or in French. DWB—For the many uses to which the parachute has been put the essential features are: reliable opening characteristics, low shock load and good stability. Three main methods of approach to the parachute design are developed: 1) The deployment of metal dive brakes at supersonic speeds with the subsequent initiation of a multi-stage parachute system (e.g., English Electric Thunderbird test vehicle); 2) the use of parachutes at all stages of recovery (e.g., Bristol Bobbin); 3) the use of a small parachute to give a terminal velocity of some 200 ft/sec and then snatching the missile parachute system with a paravane carried in an aircraft flying a collision course (Weapons Research Est., Woomera). Since it is necessary to delay release of the main parachute until the vehicle has descended to a height of 10,000-15,000 ft, the most convenient form of instrument to initiate the deployment is a barometric type switch. A switch is manufactured (differing essentially from that used for man-carrying parachutes) which requires it to withstand launching accelerations and the vibrations imposed by the missile flight. *Subject Headings: 1. Parachutes 2. Guided missiles.—A.V.*

11.2-139 551.507.362.1:77
 Baumann, R. C. and Winkler, L. (*both, Rocket Devel. Branch, Atmos. and Astrophys. Div.*), **Photography from the Viking 12 rocket at altitudes ranging up to 143.5 miles.** *U. S. Naval*

Research Laboratory, NRL Report 5273; Rocket Research Report, No. 21, April 22, 1959. 7 p., 14 photos. **DWB** (M07.362 U584r)—On Feb. 4, 1955, Viking 12 was launched at White Sands Proving Ground, N. Mex. The research equipment in the rocket included an aircraft camera which took 53 pictures at altitudes varying from 97.7 mi on the ascent, through the peak of 143.5 mi, to 87.6 mi on the descending portion of the trajectory. Excellent definition was obtained on all of the photographs. The photographs cover the area of the U. S. and Mexico to the west of WSPG. The curvature of the earth, the atmospheric layer, rivers, lakes, railroads, the Gulf of California, Lower California, the Pacific Ocean, clouds, snow-covered mountain peaks, and "smog" over Los Angeles are some of the easily distinguishable features on the photographs. Matching maps have been drawn for some of the photos to permit ready identification of pertinent geographical features. *Subject Heading: 1. Rocket photography.—Authors' abstract.* ©

INSTRUMENTS

See also: Project Prairie Grass (Haugen), 11.2-23; *Bucket temp. measurement* (Barnes), 11.2-73; *Satellite cosmic ray recorders* (Ludwig), 11.2-79; *Precip. gages* (Sadvakasov), 11.2-128; *Airplane infrared spectrometers* (Houghton et al.), 11.2-137.

11.2-140

551.508 551.524.4 551.554 551.571.4

†Huovila, Seppo (*Inst. of Met., Univ. of Helsinki*), *On the measurement of temperature, humidity and wind velocity very near the ground.* *Geophysica*, Helsinki, 6(3/4):243-274, 1958. 7 figs., 2 tables, 37 refs., 33 eqs. **DWB, DLC.** Also issued as *Helsinki. Universitet. Meteorologiska Institutet, Mitteilungen*, No. 86, 1958. **DWB**—The average vertical distribution of temperature, humidity and wind velocity near the ground is described by means of basic equations and some observational results. The common errors of measurement, as placement error and situational error and their importance, are discussed. The operational principles of electric thermometers, psychrometers and anemometers, main sources of errors and correction methods are then explained with special reference to conditions near the ground. *Subject Headings: 1. Vertical temperature distribution 2. Vertical humidity distribution 3. Vertical wind velocity distribution 4. Instrument errors.—Author's abstract.*

11.2-141

551.508.25:551.521.18

Gates, David M.; Murcay, David G.; Shaw, Clyde C. et al. (*all, Univ. of Denver, Colo.*), *Near infrared solar radiation measurements by balloon to an altitude of 100,000 feet.* *Optical Society of America, Journal*, 48(12):1010-1016, Dec. 1958. 5 figs. (incl. photos), table, 6 foot-refs., 3 eqs. **DLC**—The first recordings of the near infrared solar spectrum from high altitudes were made by an infrared spectrograph carried to an altitude of 102,000 ft by a skyhook plastic balloon on June 22, 1955, between 0559 and 0830 MST. The total absorption in the 1.9-micron water vapor absorption band and in the 2.0-micron carbon dioxide absorption band was measured as a function of altitude. The amount of absorbing constituent above each level was determined. Some indication of the pressure dependence of the carbon dioxide absorption is determined. A comparison is made with other water vapor measurements in the atmosphere. A description of the infrared spectrograph, the recording equipment, and of the biaxial pointing control is given. *Subject Headings: 1. Near infrared radiation measurement 2. Infrared spectrographs 3. Air-borne instruments. I. Herbold, Robert J.—Authors' abstract.*

11.2-142

551.508.25

Höhne, Werner, *Die Auswirkung von Asymmetrien auf die Messergebnisse von Strahlungsbilanzmessern mit zwei Doppelplatten.* [Effect of asymmetry on the readings of radiation balance meters with two double plates.] *Germany. Deutscher Wetterdienst, Berichte*, 7(51):14-18, 1959. 2 figs., 14 refs., 18 eqs. German and English summaries p. 14. **DWB, DLC**—The errors arising with net radiometers having two sensing elements under stationary conditions, caused by asymmetries of the thermal resistances in the heat flux plates, are evaluated. In this calculation the thermal resistance between the radiation receivers and the heaters, between the heaters and temperature-sensitive elements, and also the asymmetries in all analogous resistances are considered. It is seen that differences of the thermal resistances are able to

produce remarkable errors. The effect of asymmetries to the calibration curves of the measuring devices and the results of measurements are discussed. Finally, the errors of response are evaluated, resulting from fluctuations of the heat transmission resistances with constant net radiation. *Subject Heading: 1. Radiation balance meter errors.—Author's abstract.*

11.2-143

551.508.25

Lossnitzer, H. (*Met. Inst. Freiburg Univ.*), **Spektrale Durchlässigkeit verschiedener Filtermaterialien.** [Spectral transmissivity of various filter materials.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 3(3/4):434-440, 1959. fig., 5 tables. German, English and French summaries p. 434. **DWB, DLC**—The author presents the values for the percentage transmissivity of different filter materials used for radiation measurements (Schott OG 1, RG 2, RG 8 glass filters; lupolen H; thin plates of semi-conductors, interference filters); these values have been determined by means of a Zeiss spectrophotometer. *Subject Headings: 1. Radiation filters 2. Spectral transmittance of filters.—Author's summary.*

10.2-144

551.508.43:629.135.15

§Krieg, W., **Verwendung von Höhenschreibern und Auswertung von Diagrammenstreifen auf Streckenflügen.** [Use of altitude recorders and development of recordings during gliding.] *Schweizer Aero-Revue*, Berne, 34(6):367-371, June 1959. 4 figs., chart. **DLC**—Description of an altitude recorder, made by the Peravia firm in Switzerland, which records the altitude every six seconds. The author gives an example showing the importance of the recording during the flight of a glider from Biel to Marseille, made by HANS NIETLISPACK. The details of the flight are shown and also the different recordings obtained. The glider was a Super Spatzone, the distance 448 km, the time of the flight 7½ h and the speed 60 km/h. The recorder was also used by DICK JOHNSON during his flight of Aug. 12, 1950 over 336 mi. *Subject Headings: 1. Gliding 2. Altitude recorders.—A.V.*

11.2-145

551.508.54

Kaimal, J. C. and Badgley, F. I. (*both, Meteorology Dept., Univ. of Washington*), **An absolute anemometer for low wind speeds.** (In: Washington (State). College, *Proceedings of the WSC Hydraulics Conference*, Oct. 1957, Pullman, Wash. pub. 1957. p. 219-224. 5 figs., 3 refs.) **DWB**—Accurate measurements of wind velocity at low speeds using several types of anemometers with varying precisions had not proven successful or promising until KOVASNAY in 1949 calibrated hot-wire anemometers which worked with greater accuracy and response speed than anything else previously used. A description of this instrument with its advantages over other phase-detecting techniques, its limitations, tests, and results are given. *Subject Heading: 1. Hot wire anemometers.—N.N.*

11.2-146

535.41:53.089:551.508.54

Philbert, Michel, **Applications métrologiques de la strioscopie interférentielle.** [Metrological applications of interferential strioscopy.] *Revue d'Optique*, Paris, 37(12):598-608, Dec. 1958. 14 figs., table. **DLC**—Interferential strioscopy constitutes an application of the principle of differential interferometry to the study of aerodynamic efflux in a wind-tunnel. Description of an interferential strioscopy instrument, especially designed in view of its rational utilization in the wind tunnel, is given. The author explains the plan of the optical device and the adjustment and control of the optical parts of this apparatus. He reviews the study of aerodynamic phenomena, the quantitative study and the methods of analysis. Two examples (the study of an aerodynamic efflux and the study of a low pressure supersonic efflux) show the possibilities of this technique which can be very useful in meteorology, and particularly in testing anemometers. *Subject Headings: 1. Optical metrology 2. Interferential strioscopy 3. Anemometer testing.—A.V.*

11.2-147

551.508.54

Thornthwaite, C. W. (*Lab. of Climatology, Centerton, N. J.*), and Halstead, M. H. (*A. & M. College of Texas*), **Modified SCS cup anemometers.** (In: Lettau, H. H. and Davidson, Ben. (eds.), *Exploring the atmosphere's first mile*. N. Y., Pergamon Press, 1955. Vol. 1:128-133. fig., 2 refs.) **DWB**—After reviewing the instrumentation problems encountered in studies

of micrometeorological wind gradients, the authors describe the characteristics of the Hastings anemometer and the anemometer developed by Casella & Co., Ltd. of London (described by P. A. SHEPPARD) and the refitting of the Soil Conservation Service 650 Friez three cup anemometer, Model 339. The use of the latter anemometer in making wind profile observations at O'Neill is discussed. *Subject Heading: 1. Cup anemometers.—I.L.D.*

11.2-148

551.508.822

†Mani, Anna; Venkataraman, C. N. and Huddar, B. B. (*all, Met. Office, Poona*), **Radiation and lag errors of the F-type radiosonde.** *Indian Journal of Meteorology and Geophysics*, Delhi, 10(2):189-198, April 1959. 4 figs., 5 tables, 22 refs., 8 eqs. DWB, DLC—The results of experimental investigations carried out at Poona, India to determine the radiation and lag errors of the F-type radiosonde are reported. Factors affecting radiation errors, methods of computing them, theoretical basis and arrangement of experiment have been considered and the ensuing results have been indicated. Comparison is made with other sondes, and errors observed from day and night soundings as well as lag errors have been reported. It is concluded that: 1) the radiation errors at solar altitudes of about 45°, amount to 1.2, 2 and 2.5°C at 10, 15 and 25 km. Lag errors amount to 0.4 and 0.6°C at 10 and 15 km, respectively. *Subject Headings: 1. F-type (Indian) radiosondes 2. Radiosonde lag errors Poona, India.—I.S.*

11.2-149

551.508.91:551.510.721

Welford, George A. and Harley, John H. (*both, Health and Safety Lab., USAEC*), **A new method for collection of fallout material from nuclear detonations.** *U. S. Atomic Energy Commission, HASL (Health and Safety Lab.)*, No. 42:355-359, Oct. 1958. 2 figs., 2 tables, 4 refs. DWB (M914.143 U581en)—A collection system is presented and evaluated for the off-site measurement of fallout material. The collector consists of a funnel, ion-exchange column, and leveling device—all constructed of polyethylene. The ion-exchange column is packed with paper pulp, anion exchange resin, and cation exchange resin. This unit can be exposed for monthly periods, and the column can be conveniently shipped to a central laboratory for analysis of the fission-product content. This paper covers a six-month evaluation period and a comparison of the results with that obtained by the open-pot method of collecting fallout material at the same physical site. *Subject Heading: 1. Radioactive fallout measurement techniques.—N.N.*

11.2-150

551.508.94:551.509.58:551.594.22

MacCready, Paul B., Jr. (*Met. Res., Inc.*), **Equipment for forecasting lightning danger.** *Conference on Atmospheric Electricity, 2nd, Portsmouth, N. H., May 1958, Proceedings*, issued 1958. p. 413-420. 4 figs., ref. DWB (M(055) C748pr)—Handling explosives and fuels and working in exposed places can be dangerous when lightning is in the vicinity. Equipment has been developed in an attempt to provide some warning of the danger. The principal tool is a potential gradient recorder, having an all-weather radioactive probe, and with a nonlinear amplifier so that both storm gradients and fair weather fields can be recorded at one scale setting. By forecasting with the trace characteristics (rather than only with the instantaneous value of the gradient, and by using a few simple forecasting rules, the equipment has been found to be capable usually of giving a 20-90 min warning of dangerous lightning conditions. Sferics type and potential gradient type lightning counters are described which can also help the forecasting of lightning danger. *Subject Headings: 1. Lightning danger forecasting 2. Potential gradient recorders 3. Lightning counters.—Authors' abstract.*

11.2-151

551.508.99:551.501.5

Višnovský, Pavel, **Nový přístroj na interpoláciu izočiár "Interpolátor MV-55."** [A new instrument for isoline interpolation, the "MV-55 interpolator."] *Meteorologické Zprávy*, Prague, 10(3):80-82, 1957. 3 figs., 4 refs. DWB—A novel device (the first of its kind to appear in literature, it is claimed) was designed by the author and is described in detail and shown in a photograph and diagrams. The device consists of a transparent polyvinyl sheet on which exponential curves are printed. The sheet is mounted in a plastic holder and can be adjusted by means of a dial, so as to place the proper section of curves into position at the edge of the holder. Although originally developed for geodetic work, the device is suited for

interpolating any isolines. It can be used for linear or nonlinear interpolation. Accuracy, ease and speed of operation and ruggedness are claimed. The instrument is being manufactured at Bratislava. *Subject Headings:* 1. Interpolators 2. Isoline interpolation 3. Graphic interpolation.—G.T.

SYNOPTIC ANALYSIS AND FORECASTING

See also: Storm runoff forecasting (Befani), 11.2-11; Winter precip. forecasting (Funke), 11.2-19; Flood forecasting, Japan, 11.2-22; Severe storm warnings (U. S. A. W. S.), 11.2-33; Hurricane forecasting (U. S. W. B.), 11.2-34; Synoptic met., Mediterranean (Veranneman), 11.2-44; Synoptic conditions for fog, Antarctica (Rubin), 11.2-52; Forecasting wind effects (Weenink, Groen), 11.2-67; Sea ice forecasting (Karakash), 11.2-86; Fire weather forecasting (Schroeder), 11.2-114; Synoptic background for record April min. temp., First Conn. Lake (McGuire, Sable), 11.2-202.

11.2-152 551.509.325:551.591:629.13
Harrison, Henry T. (*Dir. of Met., UAL*), Forecasting sub-minimum fog at Baltimore Friendship Airport. *United Air Lines, Inc., Meteorology Circular*, No. 45, Jan. 15, 1959. p. 28 figs., 2 tables, 9 refs. DWB (M:629.13 U58mc)—A description and data presentation on the capabilities of predicting subminimum weather 3 to 9 hours in advance has been given in relation with the observations at the Baltimore Friendship Airport. Visibility and other meteorological factors at the Baltimore Friendship Airport are compared with those at Washington National Airport. *Subject Headings:* 1. Fog forecasting 2. Short range forecasting 3. Friendship Airport, Baltimore, Md.—N.N.

11.2-153 551.509.317:551.547.1
Hering, Wayne S. and Mount, Wayne D., Specification of 200-Mb. and 100-Mb. contour heights by vertical extrapolation of lower-level data. (In: American Meteorological Society, District of Columbia Branch, *Proceedings of the Workshop on Stratospheric Analysis and Forecasting*, Feb. 1-3, 1956. pub. 1956. p. 98-116. 11 figs., 3 tables, 4 refs., 2 eqs.) DWB
The problem of estimating 200 mb and 100 mb contour heights in regions of sparse data was investigated by supplementing these upper level data with interpolated data from mid-tropospheric altitudes where observations of wind, temperature and pressure height are more plentiful. Also the application of the derived interpolation method to extend vertically prognostic charts prepared by numerical weather prediction techniques is examined. The specifications of static stability or mean vertical temperature between the lower level observational data and the upper level to be interpolated is examined by considering the accuracy with which the mean temperature must be determined to enable specification of the thickness between two constant pressure surfaces to be determined, the extreme variation in horizontal temperature gradient and static stability in the vicinity of the tropopause and vorticity influence on lapse rates. The regression equations relating the 200 mb pressure height (Z_2) to the 400 mb height (Z_4) and the 700 mb height (Z_7) for each season under conditions in which $Z - Z_0$ or the Laplacian contour height has an absolute value less than 50 ft are presented. It is shown that reliable estimates of the 200 mb surface are conveniently obtained from data at and below the 100 mb level, that geostrophic winds determined from extrapolated values of 200 mb are comparable favorably in accuracy with geostrophic winds obtained from observed contour height data at the 200 mb level. It is impractical to derive values of 100 mb wind vertical extrapolation of the 100 mb contour height from lower level data. In view of the persistent nature of 400 mb to 200 mb thickness it is not advisable to utilize the specification technique for vertical extrapolation of prognostic charts. *Subject Headings:* 1. Contour height forecasting 2. Extrapolation of aerological data 3. 200 mb contour height 4. 100 mb contour height.—L.D.

11.2-154 551.509.358:551.579.1(282.243.1)
Church, James E., Forecasting the summer runoff of the Rhine River. *International Union of Geodesy and Geophysics. Assoc. of Scientific Hydrology, Toronto, Sept. 1957, [Transactions]*, Vol. 4, pub. 1958. p. 97-123. 11 tables, 9 refs. Also his: Forecasting the summer

runoff of the Rhine River, Neckar Basin. *Ibid.*, p. 124-135. 7 tables. DWB, DLC—Snow survey and forecasting techniques are described, and data are tabulated and compared with those for the Sierra Nevada. The surveying method used is the Nevada method, in which measured snow water equivalents of a few fixed courses in each watershed are reduced to seasonal percentage and correlated with the runoff of the stream at the base of the snow course. Due to the scarcity of snow-survey data, the longer series of precipitation measurement (since 1925-26) is used to compare snowmelt with subsequent runoff, and the winter, summer, and annual phases are computed. The Rhine Basin consists of 2 distinct areas, the Swiss Upper Rhine and the Lower Rhine. The Swiss Rhine area (22.5% of the entire basin) characterized by deep snow and shallow soil and provides 43.0% of the annual runoff at an efficiency of 72.9%, while the runoff efficiency of the Lower Rhine, which is situated in an area of rain, quick-melting snow, and shallow soil, is only 25.8%. The runoff efficiency of the Upper Rhine is even higher than the 67% estimated for deep-snow runoff in Central Sierra Nevada. The runoff of the Neckar River Basin is examined separately. *Subject Headings:* 1. Runoff forecasting 2. Forecasting techniques 3. Snow surveys 4. Rhine River.—SIPR abstract, 16932.

11.2-155

551.509.333/33

†Baum, Werner A. (*Florida State Univ.*) and Thompson, Philip D. (*Inst. of Met., Univ. of Stockholm*), **Long-range weather forecasting in the Soviet Union.** *American Meteorological Society, Bulletin*, 40(8):394-409, Aug. 1959. 39 refs., 7 eqs. DWB, DLC—Soviet developments in long range weather forecasting are described and evaluated. Pt. I (by W. A. BAUM), dealing with nondynamical methods, is based entirely on a literature survey. Pt. II (by P. D. THOMPSON), dealing with dynamical methods, is based partially on direct contact with Russian colleagues. Operational forecasts based upon the synoptic-empirical Multanovskii method, as modified during the last generation, appear to have been unsuccessful. This apparent failure, only very recently admitted, seems to stem in part from an almost blind adherence to the complex and somewhat mystical Multanovskii philosophy. There are definite indications that a sharp break with the past took place in the mid-fifties, but it is too soon to discern a clear trend or to estimate the impact of this break on operational capabilities. No attempts appear to have been made to apply modern statistical approaches to the problem. Soviet understanding of the basic theory of dynamical long range prediction does not seem to surpass ours. However, Russian meteorologists have been relatively forward-looking in the application of dynamical methods on an experimental or routine basis. Forecasts of surface mean monthly temperature anomalies, for the Eurasian continent, have been prepared by dynamical methods since 1952. Their accuracy appears not significantly different from that of subjective forecasts. *Subject Headings:* 1. Long range forecasting 2. Multanovskii method 3. U.S.S.R.—Authors' abstract.

ARTIFICIAL PRECIPITATION

See also: Cloud seeding generator (Fuquay, Wells), 11.2-239.

11.2-156

551.509.616:551.576.11:551.594.2:551.574.1

MacCready, Paul B., Jr. (*Res. Associate, The Munitap Foundation, Inc.*), **The lightning mechanism and its relation to natural and artificial freezing nuclei.** *Conference on Atmospheric Electricity*, 2nd, Portsmouth, N. H., May 1958, *Proceedings*, issued 1958. p. 369-381. 11 figs, 1 table, 9 refs., eqs. DWB (M(055) C748pr)—Observations during cloud physics field project in Montana, Florida and California have been consistent with the view that strong electrification of convective clouds is a result of the fall of hail or graupel through a supercooled cloud. This type of electrification can be related quantitatively in a simple hydrometeor-growth model to the freezing nuclei concentration, the upcurrent strength, the cloud base temperature and the cloud depth. Clouds with bases at the freezing level were investigated. For such clouds it was found that there were three distinct hydrometeor-growth regimes: "Complete overseeding" when so many nuclei are present that glaciation prevents any of the hydrometeors from growing large enough to fall through the upcurrent. "Shower precipitation" when hydrometeors fall down through the cloud base, but deplete the water in the cloud enough

to inhibit subsequent hydrometeor-growth. "Equilibrium precipitation" when there are so few nuclei that the hydrometeors do not materially reduce the liquid water content of the cloud. The results indicate that silver iodide seeding can strongly decrease the electrification of a cloud only for "complete overseeding." For moderate upcurrents this requires somewhat greater nuclei concentrations can only produce a marked decrease of electrification by some secondary effect on cloud dynamics beyond the scope of this study. The study also shows that (a) when the clouds are cold enough for natural nuclei to cause precipitation, silver iodide will speed the precipitation process but not add substantially to the total amount, (b) over broad limits the concentration of silver iodide is not critical for precipitation, and (c) a decrease in damaging hail is well within the range of conventional silver iodide seeding. *Subject Headings:* 1. Convective cloud electrification 2. Cloud seeding effects 3. Overseeding with silver iodide 4. Nuclei effects on electrification.—*Author's abstract.*

11.2-157

551.574.11:551.509.61

Pettersen, Sverre (*Chic. Univ.*), **Reports on experiments with artificial cloud nucleation: Introductory note.** *Meteorological Monographs*, Boston, 2(11):1-4, July 1957. 4 refs. DWB, DLC—A review of history of weather modification research in the U. S., seeding with dry CO₂, warm and cold cloud seeding, Project Cirrus, the Cloud Physics Project, the work of the Advisory Group on Weather Modification (1951-54), and field projects under the Advisory Group: (1) Extratropical cyclones, (2) Migratory cloud systems, (3) Convective clouds, (4) Cold stratus and fog, (5) Ice fogs, (6) Warm stratus. The review serves as an introduction to the meteorological monograph on cloud and weather modification (Vol. 2, No. 11). *Subject Headings:* 1. Cloud seeding projects 2. Weather modification.—*M.R.*

11.2-158

551.509.617:546.264

Bartnicki, L., **Sztuczny deszcz.** [Artificial rain.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(3/4):185-187, 1954. ref. DLC, DWB—A discussion of the problem of artificial rain making by seeding with crystals of carbon dioxide, or throwing small bombs containing several grams of carbon dioxide snow into cumulus clouds. The author mentions the experiments made by LANGMUIR and SCHAEFFER in the U. S. in 1945, experiments made in France over La Beauce as well as Soviet studies of the problem. *Subject Headings:* 1. Artificial precipitation 2. Cloud seeding with carbon dioxide.—*A.M.P.*

11.2-159

551.509.617:551.507.362.1(67)

Brazell, J. H. and Taylor, C. M. (both, *East African Met. Dept.*), **Artificial stimulation of rainfall in East Africa by means of rockets.** *Nature*, London, 181(4620):1421, May 17, 1958. DWB. Also issued as: *East Africa High Commission. Meteorological Department, Memoirs*, 3(6), 1959. 4 p. 2 figs., table. DWB, DLC—Significant results on the artificial stimulation of rainfall have been achieved by the East African Meteorological Department since work began along this line in 1950. In the latest series of experiments they have successfully used rockets for cloud seeding. The experiments were carried out during November-December 1956 at Tabora, Tanganyika, over the Tabora reservoir catchment area. A more extensive report is expected. *Subject Headings:* 1. Cloud seeding from rockets 2. Cloud seeding in East Africa 3. East Africa.—*N.N.*

11.2-160

551.509.617:061.3

McDonald, James E. (*Inst. of Atmos. Physics, Univ. of Arizona, Tucson*), **Scientific basis of weather modifications.** *Science*, Wash., D. C., 124(3211):86-87, July 13, 1956. DLC—The main conclusions regarding effectiveness of cloud seeding carried out during the past 5 or 6 years, as expressed by various experts from nine foreign countries and the U. S. at the International Conference on the Scientific Basis of Weather Modification, April 10-12, 1956, at the Univ. of Arizona's Institute of Atmospheric Physics (see 8.1-5, Jan. 1957, *MAB*), are summed up and the impressions of the layman as well as the scientist expressed in the words of Dr. REICHELDERFER as "realistic optimism" where heretofore there has been a wide range of feeling from wild enthusiasm to complete pessimism. *Subject Headings:* 1. Cloud seeding effectiveness 2. Weather modification conferences 3. Tucson, Arizona.—*M.R.*

11.2-161

551.509.317:551.577.2

Woodbury, Max A. and Klein, Eleanor, **Final report of the statistical weather advisory project (of) New York University College of Engineering Research Division.** (In: U. S. Advisory Committee on Weather Control, **Final Report, 1957**, pub. 1957. Vol. 2:86-91. eqs.) Reprinted from *U. S. Advisory Committee on Weather Control, Technical Report*, No. 6. **DWB, DLC**—This report is concerned with the methodology of the statistical evaluation of the effectiveness of cloud seeding operations in South Dakota carried on during May, June, July and August. The various computations for evaluating the effect of seeding upon precipitation are described. These are as follows: (1) examination of a possible trend of rainfall over time by testing the hypothesis that there is no historic polynomial trend to rainfall and temperature, analyzing the variance of the successive orthogonal polynomials of the regression analysis compared by city and month and by using a modified form of Bartlett's test of homogeneity of variance; (2) examination of the relation of sunspots to precipitation and temperature, involving correlation, regression, relation over time, correlation coefficients, and stepwise regression; and (3) numerical prediction of rainfall over an area. The computational procedure of the last method is presented and the results obtained with the various statistical procedures are summarized. *Subject Headings:* 1. Cloud seeding evaluation 2. Cloud seeding effectiveness 3. Numerical rainfall forecasting 4. South Dakota.—*I.L.D.*

ATMOSPHERIC COMPOSITION

See also: CO₂ in atmos. (Suess), 11.2-68.

11.2-162

551.510.41:546.264:551.583.3

Plass, Gilbert N., **Carbon dioxide and climate.** *Scientific American*, N. Y., 201(1):41-47, July 1959. 6 figs. (*See* 7.11-17, Nov. 1956, *MAB* for article with same title, pub. 1956.) **DWB, DLC**—A survey of present ideas on the CO₂ theory of climatic change, with lucid schematic and graphic illustrations of the processes: (1) infrared absorption by CO₂, H₂O and O₃ in spectral range from 1 μ to 23 μ ; (2) rising CO₂ concentration in atmosphere during 1860-1960 due to burning of fossil fuels and to greater amount of agriculture; (3) rising temperatures at 6 points in Northern Hemisphere during past 100 yrs; (4) CO₂ cycle atmosphere-rocks-oceans-vegetation; (5) atmosphere-ocean cycle under 3 different CO₂ regimes. Quantitative estimates of temperature rise of 1°F for each 13% increase of CO₂ content of atmosphere agree with actual increase in past 100 yrs. By the year 2000 the increase should be 3.6°F, and in 1000 yrs with 10 times the CO₂, the earth's temperature should increase 22°F, and on reaching equilibrium with ocean 12.5° above present. Mountain building and glaciation are also considered. *Subject Headings:* 1. CO₂ theory of climatic change 2. Climatic changes.—*M.R.*

ATMOSPHERIC POLLUTION

See also: Lit. review of air pollutants (Wohlers, Bell), 11.2-65; Aerosol size distribution (Georgii), 11.2-235; Bioclimatic aerosol research (Nüchel), 11.2-279.

11.2-163

551.510.42:551.578.41

Nakaya, Ukichiro, **Snow crystals and aerosols.** *Sapporo, Japan. Hokkaido Univ. Faculty of Science, Journal, Ser. 2 (Physics)*, 4(6):341-354, 1955. 8 figs., 11 refs. **DLC.** Also issued in reprint as Sapporo, Japan. Hokkaido Univ. Faculty of Science, Contract AF 62(502)-1228, **Scientific Report**, No. 1, 1955. **DWB**—Results of previous experiments at the Low Temperature Laboratory of Hokkaido University (1938-45) with artificial snow crystals are summarized. The Ta^{-s} diagram showing conditions of temperature and supersaturation with respect to ice for various shapes of snow crystals is reproduced, and another similar diagram showing equal liquid content of water droplets also presented and discussed. Electron microscope studies of snow crystal nuclei (since 1948) are then reviewed and more recent studies on the effect of removal of aerosols in the shape of snow crystals summarized. Photographs of crystals produced in ordinary air, in "half-ocean" air and in "aerosol free" air from which all fog particles had been removed show that dendritic forms give way to sheath or needle type (elongated) crystals in clean air. *Subject Headings:* 1. Snow crystal shape

4. Aerosol effect on snow crystal growth. I. Sapporo, Japan. Hokkaido Univ. Faculty of Science.—M.R.

UPPER ATMOSPHERE-IONOSPHERE

See also: Upper atmos. research, 11.2-1; Ionos. soundings, Dumont d'Urville (Lazarus), 11.2-47; Upper atmos. obs. (Janicki), 11.2-78; Upper atmos. obs (Paetzold), 11.2-80; Outer atmos. and geomagnetic storm (Kato, Watanabe), 11.2-89; Heat exchange in lower stratosphere (Chiu, Greenfield), 11.2-177; Stratospheric turbulence (Mani et al.), 11.2-221; Ionos. ionization during eclipse (Minnis), 11.2-284; Ionos. obs. during eclipse (von Klüber), 11.2-285.

11.2-164

523.74:550.385:551.510.535:621.396.1

Pecker, Jean-Claude, *Activité solaire et magnétisme terrestre*. [Solar activity and Earth's magnetism.] *L'Astronomie*, Paris, 72(12):485-498, Dec. 1958. 10 figs., 5 refs. DWB—The unsteady part of the earth's magnetic field is principally due to the electromagnetic activity of the very high atmosphere which is the most sensitive to solar influences. The first part concerns the Sun: description of the outer layers of the Sun, commentaries on solar activity, research and study of solar influences on terrestrial phenomena. The second part deals with variations of the earth's magnetism: methods of study, influences on the geomagnetic indexes, association of solar phenomena with recurrent geomagnetic activity and theory of the geomagnetism of corpuscular origin. The study of geomagnetism can supply valuable data about ionosphere and propagation of radioelectric waves. Another application of the study of geomagnetism is to meteorology, for solar influence on the terrestrial atmosphere appears to be evident. *Subject Headings*: 1. Solar activity 2. Magnetic variations 3. Geomagnetic-solar relationships 4. Geomagnetic influence on radioelectric wave propagation.—A.V.

11.2-165

551.557:551.510.535:551.501.81:551.590.25

†Rao, M. Srirama, *Analysis of meteoric body doppler radar records taken during a Geminid shower period*. *Canadian Journal of Physics*, Ottawa, 36(7):840-854, July 1958. 6 figs., 2 tables, 27 refs., 13 eqs. DWB, DLC—The determination of the prevailing wind in the 80-100 km region of the upper atmosphere by a new method, involving the simultaneous use of a CW doppler radar at 30.02 Mc/sec and three-station pulsed radars at about the same frequencies, is presented in this paper. This method involves the determination of the exact location of each observed meteor train and the component of the velocity of its horizontal drift in the direction of the azimuth from Ottawa. A 40-min. period during the Geminid shower on the night of Dec. 10/11, 1948 has been selected for this investigation. Theory for the analysis of the body doppler records is briefly outlined. The prevailing wind speed obtained from the body doppler frequencies (fd) is 54 m/sec. The observed linear variation in the average fd with time, in the case of each meteor, has been explained as caused by the effective point of reflection drifting along its train towards the maximum echo duration level. Periodic fluctuations of fd of the order of 1-3 c.p.s., on the average, have also been observed. The above two phenomena can be explained from a postulate of atmospheric turbulence on a scale of about 1 km or above. *Subject Headings*: 1. Ionospheric drift observation 2. Turbulence in the ionosphere 3. Turbulence effects on radar 4. Radar meteor records.—Author's abstract.

11.2-166

550.38:061.3 551.510.535:551.594.5:061.3

†Roquet, J. and Vassy, Arlette, *Rapport de la Section de Géomagnétisme et Aéronomie*. [Report of the Section of Geomagnetism and Aeronomy.] *Comité National Français de Géodésie et de Géophysique, Comptes Rendus*, 1957:117-134, 1958. 39 p. 35 refs. DWB—Account of the Section of Geomagnetism of the French National Committee of Geodesy and Geophysics relating to the work and research carried out in 1957 (J. ROQUET). The research and work successively examined relate to the earth's magnetic field and the telluric currents. The article ends with the examination of questions concerned with the activity of the section. The report relating to aeronomy has been written by A. VASSY; it deals with the nocturnal sky, auroras and the ionosphere. *Subject Headings*: 1. Geomagnetism 2. Telluric currents 3. Nocturnal sky and auroras 4. Ionosphere 5. France.—A.V.

11.2-167

551.510.535:523.75

Volland, H. and Taubenheim, J. (both, *Heinrich-Hertz-Institut, Deutsche Akademie der Wissenschaften, Berlin*), **On the ionospheric current system of the geomagnetic solar flare effect (s.f.e.).** *Journal of Atmospheric and Terrestrial Physics*, N. Y., 12(4):258-265, 1958. 5 figs., 8 refs., 8 eqs. **DLC**—A synoptic chart of the horizontal vectors of a geomagnetic s.f.e. and a comparison of the s.f.e. vectors of a number of selected effects at Niemegk shows that the s.f.e. current system is not a simple enhancement of the S_q current system. The s.f.e. current system is an independent system having a phase difference between 15 and 30 deg. with respect to S_q system, and flowing in a level different from the S_q current level. A correlation between the respective intensities of geomagnetic s.f.e., sudden ionospheric disturbance, and E-layer effect, suggests that both the E-layer and the D-layer contribute to the geomagnetic s.f.e. From a number of selected effects the respective contributions of D- and E-layer are estimated as nearly equal. *Subject Headings: 1. Geomagnetic solar flare effect 2. Sudden ionosphere disturbances.—Authors' abstract.*

RADIO METEOROLOGY

See also: Gravity wave effects on radio wave propagation (Gossard), 11.2-179.

11.2-168

551.510.62:621.396

De, A. C., **Some experiments on the determination of the structure and refractive index of the lower troposphere (lowest 200 ft) over Dum Dum Airport, Calcutta.** *Indian Journal of Meteorology and Geophysics*, Delhi, 10(3):295-312, July 1959. -6 figs., 3 tables, 4 refs. **DWB, DLC**—The results of low level (lowest 200 ft) radiosonde sounding made on certain selected dates and at certain selected hours during the winter season of 1956-57 and pre-monsoon season of 1957 over Dum Dum Airport are discussed. The results indicated the formation of ducts at certain hours. The variations of the meteorological data with the progress of night are shown in a tabular form. The radarscope observations at the corresponding hours are also discussed. On two occasions in March and April 1957, the duct heights were abnormally high and prevailed for the whole night persisting until or even after sunrise. It is shown that these ducts extended horizontally in all directions to about 60 mi. Some radarscope observations during February-March 1956 are also discussed. On two occasions during February 1956 elevated ducts were noticed. These prevailed for the whole night. The attenuation produced by the appearance of thick fog over the station and its masking effect on the ground clutterers are also discussed. *Subject Headings: 1. Radio refractive index 2. Radio wave transmission ducts 3. Dum Dum Airport, India.—Author's abstract.*

11.2-169

551.510.62:621.396

551.501.81

Gordon, W. E., **Incoherent scattering of radio waves by free electrons with applications to space exploration by radar.** *Institute of Radio Engineers, N. Y., Proceedings*, 46(11):1824-1928, Nov. 1958. fig., 6 refs., 13 eqs. **DWB**—Free electrons in an ionized medium scatter radio waves weakly. Under certain conditions only incoherent scattering exists. A powerful radar can detect the incoherent backscatter from the free electrons in and above the earth's ionosphere. The received signal is spread in frequency by the Doppler shifts associated with the thermal motion of the electrons. On the basis of incoherent backscatter by free electrons, a powerful radar, but one whose components are presently within the state of the art, is capable of: 1) measuring electron density and electron temperature as a function of height and time at all levels in the earth's ionosphere and to heights of one or more earth's radii; 2) measuring auroral ionization; 3) detecting transient streams of charged particles coming from outer space; and 4) exploring the existence of a ring current. The instrument is capable of 1) obtaining radar echoes from the sun, Venus, and Mars and possibly from Jupiter and Mercury; and 2) receiving from certain parts of remote space hitherto-undetected sources of radiation at meter wavelengths. *Subject Headings: 1. Incoherent scattering of radio waves 2. Radar echoes 3. Ionospheric electron density.—Author's summary.*

11.2-170

551.510.62:517.9:621.396

Lafleur, Ch., **Etude des propriétés de transfert d'un système linéaire basée sur la notion de taux d'accroissement énergétique spectral.** [Study of the properties of a transfer function of a linear system, based on the concept of the rate of growth of spectral energy.] *Electronique, Télécommunications, Electricité (revue H F)*, Brussels, 4(3):59-66, 1958. fig., 9 refs., 22 eqs. **DLC**—The use of a truncated Fourier transform makes it possible, by introducing the concept of the rate of spectral energy increase, to analyze signal energy variations with time in the different frequency bands. This method is then applied to the study of the transfer properties of a circuit. The use of this formula makes it possible to avoid the problem of filtering random signals in the temporal field, and reduces the amount of statistical information necessary for computation of a single mean value. The use of the truncated Fourier transform and of the concept of spectral energy increase makes it possible to bring out clearly the physical meaning of the Fourier transform of a correlation function. *Subject Headings*: 1. Spectral energy increase 2. Transfer properties 3. Fourier transform.—A.V.

11.2-171

551.510.62:551.515.4

Malkowski, G., **Kleinräumige Superrefraktionserscheinungen hinter einem abziehenden Gewitter.** [Small-scale superrefraction phenomena behind a moving thunderstorm.] *Meteorologische Rundschau*, Berlin, 11(5):141-145, Sept./Oct. 1958. 13 figs., table, 3 refs., 4 eqs. **DWB, DLC**—The mechanism of superrefraction of cm-waves is discussed with the aid of a formula expressing the refraction index, and three principal types of vertical distribution of the refractive index are established. These are as follows: Type I in which the refraction index (N) increases with elevation in the 0-3 km layer above the ground ($dN/dh > 0$); Type II is characterized by N being constant with altitude ($dN/dh < 0$) and in Type III, N decreases with altitude ($dN/dh = 0$). A case of small scale superrefraction arising behind a passing thunderstorm observed with the Berlin radarscope during the evening of May 8, 1958 is presented. With the aid of radar pictures the author describes the propagation of the radar echo. After passage of the echo ENE, numerous brightly illuminated ground targets appeared. These additional ground echoes became visible only within a 35 km wide strip traversed by the storm; in the other zones of the radar area the propagation toward ground targets remained normal. Two explanations are given for the brief improvement in propagation. One explanation suggests that the cause is the heavy rainfall released by the storm; as a result of rain penetration into the uppermost ground layers (in the case of 3 cm radar a ground layer of only several centimeters thickness suffices) the reflection capacity of the ground is raised. The change of reflection capacity caused by the rain is computed by means of the Fresnel equation. The other explanation is based upon the assumption that behind a thunderstorm there occur processes which bring about an N -distribution in the lower troposphere that favor the superrefraction. Detailed considerations of both explanations, graphs of the computed refraction index and radarscope pictures are presented. *Subject Headings*: 1. Superrefraction behind thunderstorms 2. Thunderstorm effects on superrefraction.—I.L.D.

RADIOACTIVITY

See also: Nuclear reactor accidents, 11.2-20; Radioactive fallout collection (Welford, Harley), 11.2-149.

11.2-172

551.510.7

*Lockhart, L. B., Jr.; Baus, R. A.; King, P. et al. (all, *Physical Chemistry Branch, Chemistry Div.*), **Atmospheric radioactivity studies at the U. S. Naval Research Laboratory.** *U. S. Naval Research Laboratory, NRL Report 5249*, Dec. 19, 1959. 14 p. 11 figs., 4 tables, 3 refs. **DWB** (M(055) U586r)—This report, presented at the Chicago meeting of the American Chemical Society (Sept. 1958), summarizes the information obtained since 1948 relative to the levels of some of the principal radioactive constituents of the normal atmosphere and traces the long-term changes that have occurred in the fission product concentration in the air at a number of sites in the Northern Hemisphere. Since the start of the IGY program much information has become available on gross fission product levels at various sites along the 80th meridian (west) from Antarctica to Greenland. Radiochemical analysis of material from the

various collecting sites has resulted in considerable information on the air concentration of such long-lived radio-isotopes as Ce^{144} , Sr^{90} , Cs^{137} , and Pb^{210} and on "stratospheric holdup," which is confirmed by the presence at all collecting sites of unusually high percentages of the long-lived radioactive material from past large-yield nuclear explosions. At no place studied, however, does the fission product concentration add any significant amount to the total radioactivity of the air. *Subject Heading: 1. Radioactivity in the atmosphere. I. Blifford, I. H., Jr. —Authors' abstract.*

11.2-173

551.510.71/72(443.611) 551.577.7

Jehanno, C.; Tanaevsky, O.; Labeyrie, J. et al., **Radioactivité de l'air et des précipitations au niveau du sol dans la région parisienne.** [Radioactivity of the atmosphere and of precipitation at ground level in the Paris area.] *Journal de Mécanique et de Physique de l'Atmosphère*, Paris, Ser. 2, 1(1):1-23, Jan./March 1959 (successor to *Journal Scientifique de la Météorologie*). 23 figs., 2 tables. French, English and Spanish summaries p. 1. DWB—This article is subdivided into three distinct parts, treating respectively: natural radioactivity, artificial radioactivity of the atmosphere and radioactivity of precipitation. Each of the parts opens with a description of the instruments and the methods of measuring radioactivity. The results obtained at Saclay, Paris (Quai Branly) and Val Joyeux since 1955 are presented. Correlations between natural radioactivity and meteorological factors are shown. Important concentrations of radon, thoron and their by-products are mainly observed with slight wind. Weather situations with a thermal inversion are very favorable to radioactive gas accumulation. A distinct correlation seems not to exist between strong concentrations and wind direction. Precipitation influences the concentration of radon derivatives in the atmosphere by washing them down to the soil, thus reducing the concentration. The artificial radioactivity of the atmosphere measured at ground level is still far below the permissible maximal dose, and seldom attains one tenth of this dose. The mean value for 1957 and 1958 is 1.5/100 of the permissible maximal dose. On the contrary, the values of radioactivity in precipitation are particularly significant, the mean values for the two years being 50 times the maximum permissible dose, the latter is $10^{-8}\mu\text{C}/\text{ml}$ for fission products in water. This radioactivity comes particularly from the stratosphere where it has accumulated since the beginning of nuclear test explosions. *Subject Headings: 1. Radioactivity in the atmosphere 2. Radioactive precipitation 3. Radioactivity measurement techniques 4. Paris area, France. I. Vassy, Etienne.—A. V. and authors' abstract.*

11.2-174

551.510.71:551.577.7

Styra, B. I., **Radioaktivirovanie atmosferynykh osadkov pod vliianiem elektricheskikh sil.** [Radioactivity of atmospheric precipitation under the influence of electric forces.] *Lietuvos TSR Mokslų Akademija. Geologijos ir Geografijos Institutas, Moksliniai Pranešimai*, 5:21-26, 1956. table, 7 refs., 14 eqs. DWB—The solution of two equations is produced describing the motion of a radioactive ion in the vicinity of a drop. The formula received yields the coefficient of the resistance of the air to the motion of ions. It is shown that activation of droplets takes place mainly by aid of Coulomb forces. However, in the abnormally directed electric fields of thunderstorm clouds, radioactivity of droplets may be due to electric polarization and induction. Radioactivation of atmospheric precipitation is fundamentally observed in the clouds. *Subject Headings: 1. Radioactive ions 2. Radioactive precipitation.—Author's abstract.*

11.2-175

551.510.721

†Libby, W. F. (U. S. Atomic Energy Commission), **Radioactive fallout.** *National Academy of Sciences, Washington, D. C., Proceedings*, 44(8):800-820, Aug. 1958. 15 figs., 2 tables, 40 refs. DLC—In this thorough review of early and recent literature on radioactive fallout data, the findings of American and foreign authors concerning the atmospheric storage and propagation and world-wide distribution of radioactive matter produced in nuclear explosions, and particularly the increased amounts of Sr^{90} , C^{14} , tritium, and other products, are summed up and data on theoretical and measured fallout distribution are presented. The author emphasizes the usefulness of the data reviewed in providing opportunities for the study of the

fallout mechanism and various meteorological and geophysical problems. *Subject Headings:* 1. Radioactive fallout data 2. Radioactive fallout research.—G.T.

11.2-176

551.510.721:551.577

Lockhart, L. B., Jr.; Baus, R. A. and Blifford, I. H., Jr. (*all, U. S. Naval Res. Lab., Wash., D. C.*), **Fission product radioactivity in the air along the 80th meridian, Jan.-June 1957.** *Tellus*, Stockholm, 11(1):83-90, Feb. 1959. 4 figs., 2 tables, 2 refs. **DLC**—Measurements of gross fission product radioactivity in the air at a number of sites along the 80th meridian (west) are reported for the period January-June 1957. The concentration of long-lived radioactive products (primarily fission products) in the air continues to remain considerably higher in the Northern than in the Southern Hemisphere. Among the more interesting developments, there has been obtained a definite inverse relation between the air concentration of radioactivity and rainfall during the dry and rainy seasons at Panama. The use of "radioactivity profiles" (plots of latitude vs. fission product concentration) to represent a cross section of the average air concentrations of fission products along the 80th meridian for any given period offers a ready means to obtain the total burden of such activity in the atmosphere for such a period and to follow its increase or decrease with time. *Subject Headings:* 1. Radioactivity in the atmosphere 2. Rain removal of radioactive products.—*Authors' abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Heat and mass transfer** (Eckert), 11.2-12; **Atmos. diffusion calculations** (De Marrais), 11.2-29; **Heat balance, Charcot Station** (Lorius), 11.2-50; **CO₂ exchange ocean-atmos** (Suess), 11.2-68; **Glider flight in thermal conditions** (Wills), 11.2-94.

11.2-177

551.511:551.524.73:551.510.53

Chiu, Wan-cheng and Greenfield, Richard S., **The relative importance of different heat-exchange processes in the lower stratosphere.** *Journal of Meteorology*, Boston, 16(3):271-280, June 1959. 6 figs., 3 tables, 7 refs., 16 eqs. **DWB, DLC.** Also issued as: New York. Univ. College of Engineering. Research Div. Dept. of Meteorology and Oceanography, Contract AF 19(604)-1755, Scientific Report No. 2, Dec. 1957. 36 p. 6 figs., 3 refs., 10 refs., 22 eqs. **DWB (M57.2 N532sr)**—The temperature variation at a fixed point in the free atmosphere or at a point which moves vertically with an isobaric surface is a result of the combined effect of radiation, horizontal advection of heat, vertical convection of heat, and other heat exchange processes. A method is presented by which the 12 hour local temperature change that would have resulted from radiative processes alone may be estimated. This method and the conventional method of determining the 12 hour local temperature change due to the horizontal advective process lead to a way of estimating the relative importance of different heat exchange processes. Following these methods the 12 hr local temperature changes in the lower stratosphere over a portion of the United States due to radiation, horizontal advection, and the vertical convective and eddy heat exchange processes combined are separately estimated from many years of radiosonde data and daily isobaric maps. The results of this study show that over the southeastern United States, at least, and probably over a much wider area, the horizontal advective process is more important than radiation in influencing the 12 hr local temperature change at the 200 mb and the 100 mb levels. These two processes are probably of equal importance near the 50 mb level. At the 200 mb level the vertical convective and the eddy heat exchange processes combined are estimated to be as important as, or even more important than the radiative processes over the same area. These conclusions are probably true for both winter and summer, but especially for winter. *Subject Headings:* 1. Heat exchange in lower stratosphere 2. Stratospheric temperature variations 3. United States.—*Authors' abstract.*

11.2-178

551.511

Garmendía Iraundegui, José, **Teoremas de Bernouilli para movimientos relativos respecto a la superficie terrestre.** [Theorems of Bernoulli on motion relative to the earth's surface.] *Revista de Geofísica*, Madrid, 13(50):175-183, April/June 1954. 2 refs., 16 eqs. **DLC**—The chemical hydrodynamic equations of Bernoulli are generalized to include the Coriolis force,

inertial forces, the relative velocity against the earth's surface and turbulence effects for applications in the study of atmospheric and oceanic processes. The treatment is presented in modern mathematical terms. *Subject Headings:* 1. Dynamics of the atmosphere 2. Hydrodynamics 3. Bernoulli-Bjerknes equation.—A.A.

11.2-179

551.511:531.51:551.510.62

Gossard, E. E., **Gravity waves in the lower troposphere over Southern California.** *U. S. Navy Electronics Laboratory, San Diego Research and Development Report; NEL/Report*, No. 709, Aug. 9, 1956. 47 p. 30 figs., 2 tables, 20 refs., 26 eqs. DWB—Micro-oscillations of pressure of 5 to 20 min in the atmosphere at sea level (sometimes associated with sea surface fluctuations called Tsunamis), are often noted at the meteorological station at Scripps Institute at La Jolla. These may affect the refractive index and radio propagation. The detailed analyses of Pibal, radiosonde data and surface wind, pressure, solar radiation, temperature, etc., show that the oscillations are internal gravity waves associated with temperature inversion surfaces. The waves can sometimes be seen and photographed (examples included) and may affect several stations, thus showing contiguity over an expanse of 100 mi. The correspondence of the oscillations in wind direction, speed and pressure are illustrated by a number of automatic traces superimposed on the same time scale. The regular short duration oscillations are never associated with storms, but usually with a "Santa Ana" situation. Erratic, long duration oscillations are often associated with cyclones or fronts. *Subject Headings:* 1. Gravity wave analysis 2. Gravity wave effects on radio wave propagation 3. Southern California.—M.R.

11.2-180

551.511.6:551.551:517.9

Hincu, S., **Consideratii pe marginea utilizării ecuației energiei în problemele de strat limită.** [Consideration on the use of the energy equation in the problems of boundary layers.] *Meteorologia Hidrologia și Gospodărirea Apelor*, Bucharest, 3(2/3):109-111, 1958. 3 figs., 3 refs., 28 eqs. English summary p. 139. DWB—The paper deduces the integral equation of energy in the boundary layer in a turbulent flow starting from the differential equations of the movement. With the help of the integral equation of energy the author solves some classical problems concerning boundary layers, the solution of which is known, as it was found with the help of other methods. The movement of a fluid along a thin plane sheet parallel with the flow direction. The determination of the stabilizing length of the flow's movement in wide flumes under pressure. The submerged liquid vein. Computations show that the use of the energy equation in boundary layer problems lead rapidly to results, the prevision of which is satisfactory from the practical point of view. *Subject Headings:* 1. Boundary layer theory 2. Energy equations.—Author's abstract.

11.2-181

551.511.13

†Sheppard, P. A., **Transfer across the earth's surface and through the air above.** *Royal Meteorological Society, Quarterly Journal*, London, 84(361):205-224, July 1958. 9 figs., table, 47 refs., 27 eqs. DWB, DLC—A more sophisticated treatment of the atmospheric "engine" than that used by theoretical dynamic meteorologists of a frictionless system with no heat sources or sinks is proposed in this excellent review article. The main stress is placed on vertical transfer of mass momentum and heat. Where direct measurements are impossible, as over the sea, direct methods are indicated. Fully turbulent flow in the layer of constant flux with neutral stability, flux calculations from surface conditions over sea and land, layer of constant flux with near neutral conditions; free convection over a horizontal surface; heat transfer and vertical motion in convection; momentum transfer in the troposphere and, finally, use of trace elements in the study of vertical transfer and exchange between stratosphere and troposphere are examined from a theoretical and an empirical point of view. Radiative transfer in the vertical is not considered. *Subject Headings:* 1. Energy transport 2. Vertical transfer of momentum, heat and mass 3. Energy exchange earth-atmosphere.—M.R.

11.2-182

551.511.2:551.558

§Fleagle, Robert G., **Theoretical and empirical relations in large scale motions (Air motions study, Pt. 4).** Washington (State). Univ. Dept. of Meteorology and Climatology, Contract

RF 19(604)-314, Occasional Report No. 7; Final Report, June 1957. 32 p. 12 figs., 17 refs., 4 eqs. DWB—The two papers contained in this report cover: 1) a linear theory of pressure tendency and vertical velocity; and 2) a physical basis for large scale motions. The simplified theory of fields of vertical motion is followed by calculations from mid-troposphere observations of east-west pressure gradient, geostrophic vorticity, static stability and latitude for U. S. and Canada. *Subject Headings: 1. Vertical wind velocities 2. Large scale vertical motion 3. Vertical motion theories.*—M.R.

11.2-183

551.511.32:551.558.1

Pédelaborde, P., *La thermoconvection*. [Thermal convection.] *Revue Géographique des Pyrénées et du Sud-Ouest*, Toulouse, 29:121-134, 1958. 5 figs., 7 refs., 6 eqs. DLC—Thermoconvection, or thermal convection, is the rising of air caused by the differential heating of contiguous fields. Computation and observation prove that the strength of these vertical currents depends essentially on the temperature contrasts in the horizontal direction. Thermoconvection is thus not a phenomenon peculiar to the "overheated hollows" during summer. It appears in every area where geography multiplies thermal contrasts. Further, this process concerns principally the lower layers. It may sometimes reinforce thundery activity, but it is not sufficient to provoke thunderstorms. In any case, it has only a very small effect upon the general rain regime. The author shows, with precise examples, the true nature of the phenomenon and computes the thermoconvective lifting power. *Subject Heading: 1. Thermal convection.*—A.V.

GENERAL CIRCULATION

See also: Catalina Eddy disrupts weather patterns (Schroeder), 11.2-114.

11.2-184

551.511.32:551.515.3:551.58

†Pédelaborde, P., *Le tourbillon, principe général à la base de la climatologie dynamique*. [Vorticity—general principle based on dynamic climatology.] *Annales de Géographie*, Paris, 67(358):481-498, Nov.-Dec. 1957. 13 figs., 31 refs. DLC—This study, intended for climatologists, is based on the actual general concept of Mechanics of the Atmosphere; it reviews the notion and definition of a vortex and gives an elementary explanation of it, with an application to the calculation of Coriolis force and the geographical consequences. The author explains clearly the law of conservation of absolute vorticity and C.-G. ROSSBY's theory of the vortex. He gives evidence of the geographical consequences of the vortex, presenting regional contrasts within the same planetary zone. These contrasts which result from the combination of the planetary factors (latitudinal variations of the relative vorticity) and of the geographical factors peculiar to every zone (variation of the absolute vorticity under the action of divergence or convergence), explain a host of climatological phenomena. The contrasts of the vortex are mentioned and analyzed for the Arctic and Antarctic frigid and subpolar zones, temperate zone, subtropical zone and intertropical zone. These examples indicate that several climatological problems may be explained by the zonal or regional distribution of the absolute and the relative vorticity. *Subject Headings: 1. Dynamic climatology 2. Vortexes 3. Conservation of absolute vorticity 4. Rossby vorticity equation 5. Convergence and divergence.*—A.V.

11.2-185

525.3:551.513.1:551.583.13

†van den Dungen, F. H.; Cox, J. F. and Van Mieghem, J., *Seasonal fluctuations in the rate of rotation of the earth*. (In: Beer, Arthur (ed.), *Vistas in astronomy*. pub. London, 1955-1956. Vol. 2:834-842. 4 figs., bibliog., p. 839-842, 5 eqs.) DLC, DWB (520.82 B415v)—Since variations in the rotation of the earth, which determines the "Earth Clock," are definitely seasonal, it is supposed that they are due to events on the earth itself, and probably to several superimposed periodic events. Seasonal changes in air masses could account for 15-20% of the observed fluctuations. Formulas used in these calculations by the authors (1949) are presented and the results shown graphically. Implications are suggested for astronomy, geophysics and dynamic meteorology. A unique bibliography of several score references, grouped in 9 sections, is appended. *Subject Headings: 1. Rotation of the earth 2. Angular momentum balance 3. Air mass effects on earth's rotation.*—M.R.

11.2-186

551.513.2:551.557.5

Johannessen, Karl R., **Three-dimensional analysis of the jet stream through shear charts.** (In: American Meteorological Society. District of Columbia Branch, *Proceedings of the Workshop on Stratospheric Analysis and Forecasting*, Feb. 1-3, 1956. pub. 1956. p. 117-128. 6 figs. Also his: *Laboratory problem and instructions: Three-dimensional analysis of the jet stream layer utilizing shear charts*, p. 165-168.) DWB—The problem is considered of whether it is possible to analyze the horizontal motion field directly from wind data without recurrence to the wind pressure relationship so as to obtain a "fairly simple representation of the three-dimensional horizontal action field in the region from 25,000-40,000-45,000 ft, based upon wind data alone." By means of a specific example it is shown that the maximum wind level does not coincide with the standard pressure surface so that the wind distribution is sought in the three-dimensional horizontal wind. The isopleths of the parameters defining the three-dimensional field are: heights of the maximum wind level, streamlines and isotachs in the maximum wind level and vertical speed below and above the maximum wind level. The analysis of the Maximum Wind Shear Chart is illustrated. The limitations of the maximum wind shear chart and its advantages are summarized. *Subject Headings: 1. Jet stream analysis 2. Wind shear charts.—I.L.D.*

11.2-187

551.513.2:551.557.5

Yamamoto, Takeo (*Yamaguchi Univ.*), **Long-term variations of the jet stream.** Trans. by E. R. Hope from original Japanese in *Kagaku* (Science), Tokyo, 27(12):630-631, 1957. Trans. issued as *Canada. Defence Research Board, Translation* 60 J, Feb. 1958. 2 p. 2 figs., table, 4 refs. DWB—Jet stream is one of the central problems in modern meteorology. This study illustrates the general climatic variation in the Northern Hemisphere with the intention of investigating the physical mechanisms that underlie the regular relationships exhibited by Japan's climatic variation. From the Tibetan Plateau area the jet stream moves northward to influence the January atmospheric temperatures in central Japan. A comparison of atmospheric temperatures, precipitation and the jet stream system of these two areas are compared and parallels are drawn with eastern Canada. *Subject Headings: 1. Jet stream variations 2. Translations. I. Hope, E. R.—N.N.*

11.2-188

551.513.7:551.590.21/22

Lee, F. W. M., **World weather and the tangential theory.** Preface dated Feb. 6, 1958, Coventry. 40 p. 37 figs. (col.). Photostat of typescript. On cover: "Presented to Dr. F. W. Reichelderfer." DWB (M10 L477wo)—A painstakingly illustrated (in color) treatise summarizing the author's "Tangential theory" of large scale weather processes—a theory based on the assumption that the moon's gravitational force can pull the atmosphere horizontally along a tangent to the earth from the moon, then vertically. Presumed effects on circumpolar currents, monsoons, trade winds, hurricanes, South African tornadoes, ordinary tornadoes, the position of the Siberian High, etc. are indicated. Astronomical aspects of sun-moon-earth seasonal relationships are given the greatest attention in the explanations and diagrams. Literature is cited but no statistical proofs presented. The theory is extended to climatic changes as well as large scale weather patterns. *Subject Headings: 1. Tangential theory of circulation anomalies 2. Atmospheric circulation anomalies.—M.R.*

ATMOSPHERIC DISTURBANCES

See also: Superrefraction behind thunderstorms (Malkowski), 11.2-171; *Vortexes* (Pédelaborde), 11.2-184; *Thunderstorm turbulence* (Williams), 11.2-216; *Thunderstorm formation* (Dessens), 11.2-243.

11.2-189

551.515.2:550.342(914)

Deppermann, C. E. (*Manila Obs., Baguio, Philippines*), **Microseisms at Baguio.** *Pacific Science Congress, 8th, Quezon City, Philippines, Nov. 1953, Proceedings*, Vol. IIA, pub. 1956. p. 1099-1102. DWB—The author discusses the reality of microseisms as a physical phenomenon, the relationship between microseisms and typhoons, between microseisms and thunderstorms, microseisms and the northeast monsoon, and between microseisms and winds. Future

aces for microseisms research are outlined. *Subject Headings:* 1. Microseisms 2. Cyclonic microseisms 3. Baguio, Philippine Islands.—I.L.D.

11.2-190

551.515.1:551.461.2:551.556.8(261.2)

Lauwerier, H. A., **Exponential windfields**. *Amsterdam. Mathematisch Centrum. Afdeling Toegepaste Wiskunde, Rapport, TW-42, Sept. 1957.* 9 p. 4 figs., eqs. DWB(M(055)528ra)—Formulas are derived and examples given for vertical rise of water on a coast due to wind stress at the surface, such as occurred in the North Sea storm of February 1953. The storm is represented by simple mathematical expressions, assuming that the storm has a constant intensity and direction in space (an infinitely wide sea of constant depth), and a single rise and fall in time (of the order of 1 day). The after effect is considered to be almost negligible (about 15% after 30 hrs), or an effect on the coast which is 4% that at the time of maximum intensity. The two cases with maximum wind 25 m/sec. give a maximum of 1.02 m and 0.97 m, respectively, about three hours after the maximum of the storm. Values more than double these would occur if the Coriolis force were taken as zero. *Subject Headings:* 1. Storm surge formulas 2. Wind stress on water 3. North Sea storm (Feb. 1953) 4. North Sea.—M.R.

11.2-191

551.515.1:525.63:532.57(282.243)

Lucht, F. (*Wasser- und Schifffahrtsdirektion, Hamburg*), **Die Strömungsgeschwindigkeit bei Sturmfluten**. [Velocity of flow in storm floods.] *Die Wasserwirtschaft, Stuttgart, 48(8):208-212, 1958.* 5 figs., 4 refs., 8 eqs. DLC—Shows that the water velocity V during storm floods for any given spot in an estuary can be related to the rise or fall in tide (T in cm per hour) by the equation $V = cT + b$. Examples for the Elbe River are given. The effect of wind is discussed. The measurement of V itself was made by means of registrations of long duration, using instruments attached to the bottom. *Subject Headings:* 1. Storm floods 2. Hydrometric observation 3. Elbe River, Germany.—A.A.

11.2-192

550.342:551.515.1/2(729.9)

Carder, Dean S. (*U. S. Coast and Geodetic Survey, Wash., D. C.*), **Microseisms at Bermuda**. *American Geophysical Union, Transactions, 36(5):843-854, Oct. 1955.* 6 figs., table, 9 refs. DWB, DLC—From an examination of above normal microseisms recorded on the Bermuda Milne-Shaw seismograph over several hurricane and winter seasons, it was found that in all cases, if the periods were 4 to 5 seconds or if the microseisms were strong, they could be attributed indirectly to local weather conditions. Occasionally weak 7 to 10 second microseisms could be traced to storm conditions from as far away as the coast of Alaska, but absorption of all microseisms across the northwest Atlantic is relatively high. Strong microseisms may be generated when local storm conditions are not apparent but when the wind is favorable for the production of opposing swells. *Subject Headings:* 1. Cyclonic microseisms 2. Microseisms 3. Bermuda.—Author's abstract.

11.2-193

551.515.1:551.557(52)

†Shimizu, T., **Upper wind pattern of extratropical cyclone at sea in the Far East**. *Journal of Meteorological Research, Tokyo, 10(5):383-396, May 1958.* 12 figs., 24 tables. In Japanese; English summary p. 383. DWB—Thirty extratropical cyclones, which moved across or very close to Japanese Islands, are investigated. A polar coordinate system, which has the instantaneous surface position of the center of each cyclone as a pole and its moving direction averaged over the following 12 hrs as initial line, is employed. The area within 500 naut mi of the surface center is divided into many overlapping regions by radii and concentric circles. All upper wind observations taken in the region, which is identical with respect to the coordinate system, are added and averaged. The results are shown in figs. and tables. Maximum and minimum wind speeds within each more roughly divided region are given in tables. *Subject Headings:* 1. Extratropical cyclones 2. Upper air wind patterns 3. Far East.—Author's abstract.

11.2-194

550.342:551.515.1:551.54(94)

Upton, P. S. (*Dept. of Geology, Univ. of Queensland*), **Cyclone microseisms at Brisbane, a new method of analysis**. *Queensland, Australia. University [at] Brisbane, University of*

Queensland Papers, Vol. 4, No. 14, 1956. 12 p. 6 figs., 2 refs. DWB (M15.1 U71cy)—Records from Sprengnether Horizontal Component Seismometers at Brisbane were used to develop a method of measuring microseism amplitudes before a cyclone has developed in order to provide early warning, and the method was tested by applying it to records for two cyclones in the sea northeast of Australia in March 1955. The amplitude of the microseisms is compared graphically with pressure and distance of the cyclones, and are correlated on a scatter diagram. The correlations appear to be quite good for pressure and distance, though a different law holds for distances up to 250 mi than for 250–1000 mi. It appears that the microseisms are surface waves. No difference was found between results from cyclones over land or sea. *Subject Headings*: 1. Cyclonic microseisms 2. Microseism-pressure relationships 3. Brisbane, Australia.—M.R.

11.2-195

551.515.13(263)

†§McQueen, Henry R. and Rammer, William A. (both, Natl. Weather Analysis Center, U. S. W. B., Wash., D. C.), *The unusual movement of the Gulf of Mexico cyclone, April 10–13, 1956. Monthly Weather Review*, Wash., D. C., 84(4):166–178, April 1956. 6 figs., 19 refs. DWB, DLC—A detailed analysis is presented of the storm of April 10–13, 1956 in the Gulf of Mexico. It provides “an example of the acceleration, deceleration, stagnation, cyclogenesis and deepening that may occur during the life of one of these Lows.” This situation was complicated further by the development of a cold core low during this period over the Carolinas. Also during its life along or near the east coast the actual track deviated considerably from the expected path. Factors associated with the erratic behavior of the storm are considered and a general comparison of forecasting techniques and an actual comparison of the forecast charts from the National Weather Analysis Center and the Joint Numerical Weather Prediction Unit are made. *Subject Headings*: 1. Cyclonic activity 2. Cyclogenesis 3. Cyclone tracks 4. Gulf of Mexico.—I.L.D.

RADIATION AND TEMPERATURE

RADIATION

See also: Cosmic ray conf., Durham, Eng. (Wolfendale), 11.2-60; Cosmic ray measurement (Ludwig), 11.2-79; Light effects on barley (Grah, Thielebein), 11.2-95; Light effects on endive (Harrington et al.), 11.2-96; Insolation effect on snow melt (Miller), 11.2-105; Infrared solar spectra obs. (Houghton et al.), 11.2-137; Near infrared radiation measurements (Gates et al.), 11.2-141; Sodium twilight airglow (Blamont), 11.2-289, 11.2-290.

11.2-196

551.506.3:551.521.1(485)

Lindholm, F., *Die Globalstrahlung in Stockholm*. [Global radiation in Stockholm.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 9(2):292–301, 1958. 2 figs., 4 tables, 12 refs. German, English and French summaries p. 292–293. DWB, DLC—Climatological means of the total radiation of sun and sky on a horizontal surface in Stockholm have been calculated from solarigraph records of the periods 1941–47 and 1949–56; these results are compared with earlier means from Stockholm (Stocksund). The striking difference of the relative global radiation between stations in the lowlands and in the highlands or in polar regions is discussed. Monthly means of hourly values in deviation from daily means are represented graphically for the period 1952–56. The characteristic daily variation of the duration of sunshine at Stockholm, showing higher values before noon than in the corresponding afternoon hours, has been found also in the daily mean variation of the total radiation of sun and sky. *Subject Headings*: 1. Global radiation data 2. Diurnal global radiation variations 3. Stockholm, Sweden.—Author's summary.

11.2-197

551.521.11:551.575(433)

Grunow, J., *Die Abschirmung des Sonnenscheins durch Talnebel im Alpenvorland*, [Screening of sunshine by valley fogs in the foothills of the Alps.] *Wetter und Leben*, Vienna, 9(6/9):99–104, 1957. 2 tables, 3 refs. DLC—The physical geography of the Ammer Valley

The flat hilly country 20 km from the edge of the Alps and the formation of valley fog are described. The principal cause of fog formation is stagnating, advected cold air. The reduction of sunshine duration in the Ammer valley (including Weilheim and Ammeisee) can be determined approximately from the sunshine hours recorded during fog hours on the Hohen-Isenberg. Data are presented on mean monthly hours during which sunshine is screened by fog (1950-1956), and on the mean hourly reduction in sunshine duration in the Ammer valley. The cases of extensive valley fog are associated primarily with two large scale weather situations favoring the formation of an intense ground inversion. One of these is the advection of cold air from the northeast sector and includes the high pressure situations BM, HM and G, and more rarely HB and HN; the other is composed of the south-southwest and south-eastern situations that produce föhn winds on the northern margin of the Alps. *Subject Headings:* 1. Sunshine duration 2. Fog effects on sunshine duration 3. Ammer Valley, Germany.—I.L.D.

11.2-198 551.521.14:551.521.64
 †Jelley, J. V. (*Atomic Energy Res. Estab., Harwell, Eng.*), Čerenkov radiation in the atmosphere. *Planetary and Space Science*, N. Y., 1(2):105-111, April 1959. 4 figs., table, 18 eqs., 6 eqs. DWB—The bursts of large numbers of electrons produced in the atmosphere by cosmic-ray air showers give rise to Čerenkov radiation in the air. The showers are therefore accompanied by light pulses of short duration; these may be detected quite easily with simple apparatus on a clear dark night. This phenomenon, which was discovered by the author and his colleagues in England in 1953, has been studied in more detail by two groups, one in the U. S. S. R. and one in Australia. In this article, the writer reviews the theoretical and experimental work that has been done up to the present time, and discusses the potentialities and limitations of the technique as a new tool for cosmic-ray research. The paper concludes with a few remarks on the future possibilities in this field, and the likely technical developments. *Subject Headings:* 1. Čerenkov radiation 2. Cosmic ray research.—*Author's abstract.* ⑤

11.2-199 551.521.14:551.521.17:551.578.45
 Suga, Taro, A study of light as affected by snow cover: the coefficient of reflection of ultraviolet and visible light at the snow surface: a brief report. Trans. by E. R. Hope from original Japanese in *Seppyo (Snow and Ice)*, 3(7):1-4, July 1941. Trans. issued as *Canada. Reference Research Board, Translation*, 23 J, Feb. 9, 1953. Available for reference DWB (M21.14 1947st)—Spectroscopic studies of sunlight on granular snow were made at the Forestry and Flood Control Research Station at Toka in Niigata Prefecture in April and May, using a Jiken Keiki quartz crystal spectrometer (illus.). The coefficients of reflection from 3000 Å to 7500 Å are compared for snow, dry earth, and snow covered with a thin layer of ashes. The dry earth reflects only $\frac{1}{3}$ of the clean snow in the UV (3000-4000 Å) but 3 times as much in the 5000-7500 Å region as in the UV (or $\frac{1}{10}$ of the clean snow). The ash covered snow reflects .4, .7 and .9 of the clean snow in the 3-4, 4-5, and 5-7.5 μ regions, respectively. *Subject Headings:* 1. Albedo of snow 2. Coefficient of reflectivity of snow.—M.R.

TEMPERATURE

See also: Severe winters, Europe (Weikinn), 11.2-16; Met. disasters, Japan, 11.2-22; Temps. effects on cauliflower (McGuire), 11.2-100; Temp.-humidity relationships (Kashin, Gritsenko), 11.2-112; Temp. estimation (Shinohara), 11.2-124; Frost probability (Shinagawa), 11.2-130; Vertical temp. distribution measurement (Huovila), 11.2-140; Heat exchange in lower stratosphere (Chiu, Greenfield), 11.2-177; Temp. effects on sea breezes, Madras (Ramakrishnan, Jambunathan), 11.2-224; Shelter belt effects on temp. (Blüskova), 11.2-278; Temp. effects on acoustical propagation (Rocard), 11.2-300.

11.2-200 551.524.31/5
 †Enger, Isadore, An empirical investigation of the period of time required to determine the normal daily maximum temperature. 1956. Thesis (M.A.)—American University, Wash., D. C. 123 p. 69 figs., table, 33 refs., eqs. DWB—Data for 10 U. S. stations for 1905-54 were used to determine the optimum length of record and interval of days necessary to establish

the normal daily maximum temperature. For the all-station chart for length of record, 25 years was established and for interval 31 days—trends, cycles and similarities are discussed and their effect considered. Charts showing root-mean-square errors of forecasting for various combinations are included. Singularities might be important for individual stations but not for the "all-station chart." Predictions were made for 1, 2, 5 and 9 years ahead; the results tested by the root-mean-square error method. *Subject Headings: 1. Length of record necessary for normals 2. Temperature normals 3. Temperature singularities.—M.R.*

11.2-201

551.524.32(45)

Frolow, Vladimir and Péreau, Aimée (both, *Muséum d'Histoire Naturelle, Paris*), *Définition morphologique de la phase de la composante annuelle des températures en Italie*. [Morphological definition of the phase of the annual component of temperature in Italy.] *Geofisica Pura e Applicata*, Milan, 43:319-322, May/Aug. 1959. fig., 6 refs. French and English summaries p. 319. **DWB, DLC**—The monthly average values of temperature, published by F. EREMIA for 482 stations, enabled the authors to calculate the phase of the annual component more expeditiously by Yakovlev's method than by Labrouste's method. The geographical distribution of the phase of annual component shows the bearings of orography, coast orientation and latitude on time distribution of this permanent fraction of temperature variations. *Subject Headings: 1. Annual temperature variations 2. Italy.—Authors' abstract.*

11.2-202

551.524.36(742)

551.509.3

McGuire, James K. and Sable, Edward (both, *Climatological Section Center, U. S. W. B., Boston*), *Synoptic background for record April minimum temperature at First Connecticut Lake, N. H., April 4-5, 1954*. *Monthly Weather Review*, Wash., D. C., 82(10):281-288, Oct. 1954. 11 figs. **DWB, DLC**—A reading of -17°F (5° lower than previous New England minimum for April) on April 5, 1954, followed within a few hours by a sudden rise to $+9^{\circ}\text{F}$ constituted a drop of 32° and a rise of 26°F within 15 hrs. A critical analysis of local and nearby temperature records, orography, snow cover and synoptic conditions confirms the record. An isotherm of -10°F , with several stations reporting -16° , -13° , -12° and -10°F embraces an area about 25 mi wide, extending into N.W. Maine, N.E. Vermont and up into Quebec. Surface and 700 mb charts for April 4 and 5, 1954 show the reason for the extremely cold air invasion (+drainage and radiation from a deep snow cover) followed quickly by a warm air advection from the S.W. *Subject Headings: 1. Record low temperatures 2. Extreme minimum temperatures 3. Synoptic case history studies 4. First Connecticut Lake, N. H. 5. Northern New England.—M.R.*

11.2-203

551.524.36

Meigs, Peveril, *Frequency and duration of high temperatures*. *U. S. Quartermaster Corps. Research and Engineering Center, Natick, Mass., Environmental Protection Research Div., Special Report*, No. 61, Aug. 1953. 8 p. 5 figs. (part fold.), 2 tables, 10 refs. Second printing, Nov. 1957. **DWB**—A study has been made to determine the frequency and duration of high ambient air temperatures throughout the world. Maps of the world included in this report show the distribution of the various frequencies and of the highest recorded temperatures. The hot deserts of the world, the tropical and Indian monsoon areas recorded temperatures at or above 110°F at least once a year. Great Plains of the U. S., the San Joaquin Valley (Calif.), the Chaco and western Pampas of Argentina, the grassland areas of Australia and South Africa occasionally experience such high temperatures. The west central Sahara, southwestern Iran and Death Valley, Calif. are the hottest areas in the world. *Subject Headings: 1. High temperature frequencies 2. High temperature duration 3. Record temperatures.—N.N.*

11.2-204

551.524.36(99)

Ten Kate, H., *Nog later nieuws over de laagste temperaturen op aarde*. [Still later news about the lowest temperatures on earth.] *Hemel en Dampkring*, The Hague, 57(4):105-106, April 1959. **DWB, DLC**—The author mentions the lowest temperatures near the ground observed during 1958. The lowest of these temperatures are: -87.4°C measured at Vostok ($78^{\circ}27'\text{S}$, $106^{\circ}52'\text{E}$, alt. 3500 m) on Aug. 25, 1958 and -83.0°C at Sovetskaya ($78^{\circ}24'\text{S}$

135°E, alt. 3700 m) on June 25, 1958. Lower temperatures up to -93.0°C have only been measured in the stratosphere at a height of 13 mi. *Subject Headings: 1. Lowest temperatures Earth 2. Vostok, Antarctica 3. Sovetskaya, Antarctica.—A. V.*

SOIL TEMPERATURE

See also: **Pandy temps.** (Suzuki), 11.2-98.

11.2-205 551.525:551.579.5:631.43
 [Gupalo, A. I., *Teplovye svoystva pochvy v zavisimosti ot ee vlazhnosti i plotnosti*. [Thermal properties of the soil as a function of its moisture and compactness.] *Pochvovedenie*, Moscow, No. 4:40-45, April 1959. 3 figs., table, 14 refs., 2 eqs. English summary p. 45. **DWB, DLC**—Heat conductivity, temperature conductivity and volume heat capacity have been determined for the southern chernozem as a function of its compactness and moisture. These properties were found to vary with the stage of soil moistening. It is concluded that the mechanism of heat conductivity of moist soil depends upon the mechanism of moisture conductivity and on the character of water binding by soil particles, that is, the thermal properties of the given soil depend on its water properties. *Subject Headings: 1. Soil temperature-moisture relationships 2. Chernozem.—Author's abstract.*

11.2-206 551.525.4(71)
 [Pearce, D. C., *Ground temperature studies at Saskatoon and Ottawa, Canada*. *International Union of Geodesy and Geophysics. Assoc. of Scientific Hydrology, Toronto, Sept. 1957, Transactions*], Vol. 4, pub. 1958. p. 279-290. 4 figs., table, 2 refs., 8 eqs. 15 in appendix. **DWB, DLC**—An analysis is presented of the annual ground temperature data obtained at Ottawa and Saskatoon, Canada, by the Division of Building Research of the National Research Council from 1952 to 1955. The annual ground temperature variation was observed to be consistent with the theory of heat flow in a homogeneous semi-infinite solid. The observations yielded an average soil thermal diffusivity which did not vary from year to year. It was possible to include a term which approximately accounted for the insulation effect of a snow cover. Additional calculation showed the order of magnitude of the deviations to be expected from variations in the soil thermal constants. *Subject Headings: 1. Ground temperature studies 2. Canada.—Author's abstract.*

11.2-207 551.525.5:536.24
 [Serova, N. V., *Issledovanie teplogo rezhima pochvy v zimnee vremia*. [Investigation of the thermal regime of the soil in winter.] *Meteorologiya i Gidrologiya*, Leningrad, No. 2:24-31, 1958. 3 figs., table, 5 refs., 3 eqs. **DWB, DLC**—The results of experimental investigations of heat coefficients and of heat flow in frozen soil are discussed. The thermal regime of soils covered with grass and with an undisturbed snow cover and of bare soils free of snow during the entire winter were studied by means of a semiconducting resistance thermometer. The total heat capacity of frozen soil was computed from individual heat capacities of the soil, ice and unfrozen water. The total heat capacity of the soil during 1954-1955 ranged within 39-0.72 cal/cm³ deg. The "true" coefficient of temperature conductivity of the soil K_t is calculated by means of the equation $K_t = K_e \left(1 - \frac{q}{c} w \frac{di}{dt}\right)$ where q =latent heat of ice formation, K_e =total heat capacity of soil, w =general soil moisture, di/dt =change in iciness of soil with temperature, K_e =effective coefficient of temperature conductivity, i.e., coefficient of temperature of frozen soil taking into account the phase transitions of water in the soil. The total heat capacity of snow is determined by the equation $cp=0.5pc$ where pc =density of snow. The flow of heat in the soil and snow is computed by the formula

$$Q(t) = c_p H \left[A(t) + \frac{2Kt}{H_2} B(t) \right]$$

where $A(t)$ and $B(t)$ =functions of distribution of temperature with depth and time in the medium investigated, H =layer in which temperature is measured, K =coefficient of tem-

perature conductivity of soil (snow) and c_p = heat capacity of snow. Data on a table and on graphs are presented on the variation of temperature on the surface of the soil and the variation of coefficient K_s in January, 1955, magnitude of the heat flow Q (in cal/cm² for six hours) through the surface of the snow cover, through the surface of the soil in a snow free area, and in soil under snow for January, 1956, and variation of the temperature on the surface of bare soil on the surface of soil under a snow cover of 20 cm and in the soil at a depth of 20 cm in a snow free area. *Subject Headings:* 1. Soil heat conductivity 2. Heat transfer coefficients 3. Frozen soil.—*I.L.D.*

WATER TEMPERATURE

See also: Vertical water temps. (La Fond), 11.2-71; Cold water effects on diatom distribution (Uyeno), 11.2-72; Sea surface temps., Millport (Barnes), 11.2-73; Temp. trends, Gulf Stream (Bjerknes), 11.2-74; Ocean temp.-dew point relationships (Moss), 11.2-231.

11.2-208

551.526.8(481)

Höydahl, Harald Sunne, *Undersökelse over variasjoner i vanntemperaturen, 1951.* [Investigation of water temperature variations, 1951.] *Videnskaps-Akademi i Oslo. Biologiske Stasjon, Norske Sørneset, Melding*, 1(1), 1954. 7 p. 4 figs. DWB (M21.1 N863me)—Pentad means of water temperature measured in various bodies of inland water near Sørneset Station in central Norway (3 times daily at 3 stations and once daily at one station) are tabulated for the period May 31 to Sept. 27, 1951. The data show local climatological differences and reflect influences of air temperature, sunshine duration and snow melt. *Subject Headings:* 1. Water temperature variations 2. Sørneset Station, Norway.—*G.T.*

PRESSURE AND WIND

PRESSURE

See also: Contour height forecasting (Hering, Mount), 11.2-153; Microseism-pressure relationships (Upton), 11.2-194.

11.2-209

551.541:551.558.21:551.551.25

Förchtgott, Jiri, *Active turbulent layer downwind of mountain ridges.* *Studia Geophysica et Geodaetica*, Prague, 1(1):173-181, 1957. 9 figs. (10 additional photos found in "Supplement," at end of the issue), 17 refs. Russian summary p. 181. DWB—On the basis of extensive gliding experience and subsequent theoretical study, the author describes and shows in diagrams, the characteristics of hill waves, lee waves, and composite waves. The role of the active turbulent layer in the formation of lee waves is discussed in detail. Photographs of typical wave clouds are presented. *Subject Headings:* 1. Lee wave development 2. Turbulence effects on lee wave formation 3. Orographic disturbances.—*G.T.*

11.2-210

551.541:551.558.21

Lyra, G., *Bemerkungen über eine gewisse Klasse nicht-konstanter Anströmprofile beim Leewellenproblem.* [Notes on a certain class of nonconstant current profiles in connection with the lee wave problem.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.Main, 31(3/4):147-151, 1959. 3 figs., 5 refs., 7 eqs. German, English and French summaries p. 147. DWB, DLC—Starting with the equation for lee waves when the current is stratified, a special type of basic current profiles is studied. This type has the property that the differential equation for the "Aufwind" or ascending current has the same form as in the case of constant wind profile. The shape of the profiles permits some physical interpretations with respect to the jet stream. *Subject Headings:* 1. Lee wave equations 2. Wind profiles.—*Author's summary.*

11.2-211

551.541:551.558.21:551.552

Merbt, H., *Solution of the two-dimensional lee-wave equation for arbitrary mountain profiles, and some remarks on the horizontal wind component in mountain flow.* *Beiträge*

Physik der Atmosphäre, Frankfurt a. Main, 31 (3/4):152-161, 1959. 7 figs., 7 refs., 33 eqs. English, German and French summaries p. 152. **DWB, DLC**—The well-known two-dimensional lee wave equation is transformed to elliptical coordinates and solved in terms of Mathieu functions for arbitrary forms of the mountain profile. In the case of a plateau, the solution reduces to LYRA's solution. As an example, the field of vertical wind velocity (first order approximation) is calculated for a symmetrical mountain profile. In the second part of this paper, the effects of mountain ranges on the distribution of the horizontal wind component are discussed. Close to the mountains, this component shows the same characteristic distribution as the vertical component. Over a plateau, the asymptotic solution does not vanish, but indicates the existence of jet-stream-like concentrations of kinetic energy. *Subject Headings: 1. Lee wave equations 2. Horizontal wind components 3. Orographic effects on horizontal wind distribution.*—*Author's summary.*

11.2-212 551.542:551.55
La Valle, Lodovico, *Azione del campo barico sul campo cinematico*. [Effect of the pressure field upon the velocity field.] *Rivista di Meteorologia Aeronautica*, Rome, 19(1):3-14, Jan./March 1959. figs., 9 refs., 13 eqs. Italian, French, English and German summaries p. 3. **DWB, DLC**—Well known equations of meteorology are taken into consideration. The action of the cinematic field is more particularly investigated. Conclusions are reached which give indications of the structure of perturbations. *Subject Headings: 1. Pressure-wind velocity relationships 2. Structure of perturbations.*—*Author's abstract.*

11.2-213 551.547.3
†Charles, B. N., *The variability of atmospheric pressure*, [Vol. 1]. *Sandia Corporation, Albuquerque, N. M., Technical Memorandum*, 243-54-51, Oct. 22, 1954. 37 p. 12 figs., 6 tables, 17 refs., eqs. Also: Vol. 2, *Ibid.*, 160-55-51, May 19, 1955. 23 p. 8 figs., 4 tables, 1 refs., eq. **DWB (M43 C475va)**—Maps and tables are presented showing mean daily D-values and their standard deviations in feet, at sea level, the 700 mb, and the 500 mb levels. The effect of altitude upon the standard deviation of daily D-value, and the annual average values over North America up to altitudes of about 50,000 ft are considered. In Pt. 2, seasonal mean daily D-values and their standard deviations are estimated at the 700-mb level (about 10,000 ft above mean sea level) over the Northern Hemisphere, and presented in maps and tables. Linear interpolation between these data and similar data for sea level, as presented in *Technical Memorandum* 243-54-51, is then used to estimate seasonal D-values and their standard deviations at the 5000-ft level. *Subject Headings: 1. Pressure variability 2. D-value forecasts.*—*Author's abstract.*

11.2-214 551.547.5
Uspenskii, B. D., *Metod opredeleniia lokal'nogo uskoreniia v izmeneniakh geopotentsial'nykh vysot izobaricheskikh poverkhnostei*. [Method of determining local acceleration in fluctuations of the geopotential heights of isobaric surfaces.] *Meteorologiya i Gidrologiya*, Leningrad, No. 3:21-27, March 1958. table, 5 refs., 16 eqs. **DWB, DLC**—The author shows that by beginning with a relatively small number of limitations not possessing fundamental significance, it is possible to solve the problem of determining acceleration in the variation of a geopotential height of any isobaric surface on the basis of data of the initial map in a form permitting a clear physical interpretation and without extensive computations. Two formulas are developed, namely

$$\left(\frac{\partial H}{\partial t}\right)_{\text{div.}} = \frac{l^2 r_1^2}{4S} \int_{L_1} C_r dL \quad \text{and} \quad \left(\frac{\partial^2 H}{\partial t^2}\right)_{\text{div.}} = \frac{l^2 r_1^2}{4} \left(-\Delta \bar{H} + \frac{1}{S} \int_{L_1} C_r dL\right)$$

which indicate that divergence influence in local variations of geopotential surfaces is determined by the flow of wind through the contour L_1 and its acceleration by the difference between the geostrophic vortex and the circulation of the wind along the L_1 contour. The results of computations with these formulas are presented by using an example with different cyclonic and anticyclonic situations at 850 and 700 mb. The computed data are given in a

table and they confirm the fundamental theoretical conclusion that in the process of development and subsidence of high altitude cyclones and anticyclones, an important role is played not only by velocity dependent upon divergence (convergence) of the wind but also by the acceleration approximately equal to the difference between the geostrophic vortex and the vortex of the wind vector. *Subject Headings:* 1. Isobaric surface height variations 2. Geopotential height.—*I.L.D.*

WIND

See: Pressure-wind velocity relationships (La Valle), 11.2-212; Wind effects on insect behavior (Haufe), 11.2-277.

GUSTINESS AND TURBULENCE

See also: Atmos. diffusion calculations (De Marrais), 11.2-29; Boundary layer theory (Hincu), 11.2-180; Turbulence effects on lee waves (Förchtgott), 11.2-209; Turbulence effects on sound propagation (Jorand), 11.2-299.

11.2-215

551.551:628.53

Stewart, N. G.; Gale, H. J. and Crooks, R. N. (all, *Atomic Energy Res. Estab., Harwell*). The atmospheric diffusion of gases discharged from the chimney of the Harwell reactor BEPO. *International Journal of Air Pollution*, N. Y., 1(1/2):87-102, Oct. 1958. 8 figs., table, 12 refs., 4+7 eqs. DWB, DLC—The 61 m chimney of the BEPO reactor discharges warm air containing a small amount of radioactive argon (A^{41}). This gas has been used as a tracer to study the diffusion of the plume in the atmosphere downwind of the chimney. Surveys have been carried out at ground level up to a distance of 10,000 m and, with instruments suspended from a balloon, up to a height of 300 m at a maximum range of 1000 m. The results have been correlated with the gradient of potential temperature in the atmosphere near ground level. The effective height of the plume is found to depend on the wind velocity and on the temperature gradient, having a mean value of 125 m under adiabatic conditions when $u=7$ m/sec. The diffusion of the plume over the range studied occurs in three distinct phases. Near the chimney, the rate of vertical diffusion is about twice that in the horizontal direction as a result of the discharge conditions. As the plume diffuses towards ground level it enters a region dominated by building turbulence and the rate of diffusion in both directions is greatly increased. Finally, as it travels beyond the built-up area, the rate of diffusion reverts to that characteristic of diffusion over open country. Sutton's diffusion equations cannot be simply applied to this complex type of problem, but they provide a useful model for classifying the data, and effective values of the virtual diffusion constants C_v and C_s are derived for each stage of the diffusion process. Under adiabatic and stable conditions, peak ground-level concentrations between 1.3×10^{-6} and 3.5×10^{-6} units/m³ were observed at approximately 1000 m downwind with wind velocities in the range 6 to 12 m/sec and a chimney emission rate of 1 unit/sec. Under statically stable conditions no detectable concentrations were found on the ground within 10,000 m of the chimney. This paper is a shortened version of an *A.E.R.E. Report* (Stewart et al., 1954; see 9.8-199, Aug. 1958, *MAB*). *Subject Headings:* 1. Stack meteorology 2. Radioactive argon (A^{41}) tracers 3. Harwell, Eng.—*Authors' abstract.*

11.2-216

551.551:551.558.1:551.515.4

Williams, D. T. (U. S. Weather Bureau, Kansas City, Mo.), A theoretical estimate of draft velocities in a severe thunderstorm. *Monthly Weather Review*, Wash., D. C., 87(2):65-68, Feb. 1959. 4 figs., 3 refs., 5 eqs. DWB, DLC. Also in manuscript form. Kansas City, Mo., U. S. Weather Bureau, Aug. 29, 1957. 8 p. 6 figs., 2 tables, 5 refs., 4 eqs. Mimeo. DWB (M51 U587 th)—Small scale surface divergence in the vicinity of a severe thunderstorm is used with an assumed distribution of divergence with height to yield vertical velocity by the mass-continuity relationship. In the case studied a maximum updraft of 212 ft/sec and a maximum downdraft of 143 ft/sec are computed. Since small scale surface divergence can be computed by the equation for a wind shift line, the forecasting of updraft velocities is operationally feasible. *Subject Headings:* 1. Thunderstorm turbulence 2. Updraft velocity forecasting 3. Divergence.—*Author's abstract.*

11.2-217

551.511.6:551.551

Panofsky, Hans A. and Rao, V. R. K., **Structure of atmospheric turbulence close to the surface over smooth terrain.** Pennsylvania. State Univ. Mineral Industries Experiment Station. Dept. of Meteorology, Contract AF 19(604)-2252, Final Report, Oct. 15, 1958. 77 p. 21 figs., 5 tables, 13 refs., eqs.—This report summarizes a number of applications of eddy and fine-structure data obtained in connection with Project Prairie Grass. The following conclusions were drawn: 1) At night, the general shapes of the Eulerian and Lagrangian correlation functions tend to be similar, with the Lagrangian time scale about four times the Eulerian time scale, in cases where both can be estimated. At daytime, the scales are more nearly equal. Both functions fluctuate strongly with stability. 2) Taylor's hypothesis regarding the relation between time and space correlations appears to be well satisfied up to a distance of 90 m. 3) The assumption of a normal distribution and a constant wind leads to good estimates of maximum concentration of effluent, and of areas of dangerous concentration, if the source strength, horizontal and vertical effluent dispersion variances are known. 4) Two methods estimating these variances from wind and stability are discussed and compared with observations. Both are satisfactory in unstable conditions. Under stable stratification, the commonly occurring gradual turning of the wind leads to systematic underestimates of the dispersing power of the atmosphere. Errors in the other direction also occur. The theory of the influence of the turning of the wind is discussed. 5) The spreading of effluent at a given distance from the source increases with increasing wind at night, but decreases in unstable stratification. 6) Techniques to estimate spectra from wind, height and release rate are modified and tested. 7) Various techniques used to estimate ionospheric drift on the basis of cross correlation analysis are tested. No technique is completely satisfactory. 8) Correlation functions following the mean wind seem to have similar properties as those following individual particles. 9) The scale at right angles to the flow is much smaller than that along the flow at night, but about the same at daytime. *Subject Headings: 1. Turbulence structure 2. Turbulent diffusion 3. Project Prairie Grass.—Authors' abstract.*

11.2-218

551.511.6:551.551.2

Panofsky, Hans A. and Deland, Raymond J., **Structure of turbulence at O'Neill, Nebraska, and its relation to the structure at Brookhaven National Laboratory, Upton, Long Island.** Pennsylvania. State Univ. Mineral Industries Experiment Station, Dept. of Meteorology, Contract AF 19(604)-1027, Final Report, Nov. 1, 1957. 77 p. 32 figs., 2 tables, 15 refs., eqs. **WB (M51 P415st)**—A statistical study of the variance, co-variance and co-spectra of O'Neill, Nebr. and Brookhaven, N. Y., with respect to roughness, wind velocity components, radiation, lapse rate and height. Two types of spectral elements were noted: low frequency convective function of lapse rate and short wave radiation and independent of wind speed and roughness), and high frequency mechanical (sensitive to roughness and independent of stability). The former increases with height and the latter decreases with height; the former is large in daytime and small at night. The vertical spectrum near the ground is controlled only by the proximity to the ground. Eddy structure and effect of roughness on turbulence spectra are treated in the last 2 chapters and the 4 appendices give data on the power spectrum and its computation, in conditions during observation periods at Brookhaven and O'Neill, spectral estimates of $S(n)$ at the 2 locations and regression equations for spectral estimates at the 2 places. *Subject Headings: 1. Turbulence structure 2. Turbulence spectra 3. O'Neill, Nebr. 4. Brookhaven, N. Y.—Authors' abstract and M.R.*

11.2-219

551.551.5:551.501.81

Fleisher, Aaron, **Some spectra of turbulence in the free atmosphere.** *Journal of Meteorology*, Boston, 16(2):209-211, April 1959. 2 figs., 7 refs. **DWB, DLC.** Also issued as: Massachusetts Institute of Technology. Dept. of Meteorology. Weather Radar Research, Contract DA-36-039 SC-71136, Research Report, No. 31, Nov. 1957. 4+iv p. 5 refs., eqs. **WB (M01.81 M414w)**—"The average rate at which the radar signal crosses a voltage level" as a function of "the root mean square of the turbulent wind component in the direction of the beam and constitutes an anemometer with these characteristics." The spectra computed in this paper were from sets of points obtained between intervals of 3.75 sec. Time differences and variations for some wind and turbulence measurements are indicated. Appendices give a

description and basis for method of computing the power spectra, and the Fourier coefficients of the data. *Subject Headings:* 1. Turbulence spectra 2. High level turbulence 3. Radar turbulence measurement techniques.—N.N.

11.2-220

551.551.5:551.558.29 (71)

McKay, G. A., Some instances of marked turbulence and subsidence. *Canada. Meteorological Branch, CIR-3174, TEC-296, March 16, 1959.* 7 p. 19 figs., table, 14 refs. **DWB**—Some unusually intense subsidence and turbulence which were experienced by aircraft flying between Calgary and Vancouver are described along with the synoptic situation. In each instance conditions were favorable to strong lee wave development, a jet stream was overhead with a maximum in the immediate vicinity, and a strong maritime cold front was invading the area. *Subject Headings:* 1. Turbulence encountered by airplanes 2. Subsidence 3. Southwest Canada.—*Author's abstract.*

11.2-221

551.551.5:551.510.53

Mani, Anna; Sivaraman, K. R. and Venkiteshwaran, S. P. (all, *Met. Office, Poona*), Evidence of turbulence in the stratosphere. *Indian Journal of Meteorology and Geophysics, Delhi, 10(2):179-184, April 1959.* 2 figs., 2 tables, 3 refs. **DWB, DLC**—Records of Dines meteorograph ascents made in India at Agra, Poona, Hyderabad, Madras and Bangalore indicate that when the balloon bursts in the stratosphere, there occurs a blur, indicating violent oscillations. Temperature trace, humidity trace, and datum pen (Fig. 1) reflect this jerk. Through a discussion of the available data (Tables 1, 2) the explanation put forward is the existence of turbulence in the stratosphere. It is indicated that Indian records support ARNOLD's (1954) observations of turbulence at Belmar, N. J. The arguments denying the possibility of any other explanation for the occurrence of the blur conclude the discussion. *Subject Heading:* 1. Turbulence in the stratosphere.—I. Said.

11.2-222

551.511.6:551.551.5

†Sasaki, Yoshikazu, A theory and analysis of clear-air turbulence. Texas. Agricultural and Mechanical College. Dept. of Oceanography and Meteorology, Contract AF 19(604)-1565, Scientific Report, No. 1, May 1958. 75 p. 19 figs., +11 figs., table, 6 refs. +19 refs., 22 eqs. +72 eqs. **DWB (M51 T355sc)**—A convenient stability diagram is used for the analysis of clear air turbulence in the region of the jet stream. Application of this stability diagram analysis to the data from four B-47 Project Jet Stream flights shows a rather systematic distribution of clear air turbulence and also important effects of the tropopause and other similar discontinuities on clear air turbulence. Theoretical explanations for the distribution of clear air turbulence in the diagram are tested considering simplified models of stratification of the atmosphere near the tropopause and jet stream. New stability criteria are obtained by the theoretical treatment and applied to the observed data. The results are given showing comparison between the computed unstable region and the observed distribution of clear air turbulence. *Subject Headings:* 1. Clear air turbulence 2. Turbulence theories.—*Author's abstract.*

WIND VARIATION

See also: Wind frequency data, Camp Cooke, Calif., 11.2-21.

11.2-223

551.553.1:551.556.3 (540)

*Ramdas, L. A. and Ramakrishnan, K. P., Wind energy in India. *UNESCO, Arid Zone Research, 7:42-55, 1956.* 2 figs., 18 tables, 11 refs. French and Spanish summaries p. 54-55. **DWB, DLC**—A brief discussion of the variation of wind velocity with height and the destructive effects of extensive winds is followed by tables giving the mean daily wind velocities for 182 stations in India, based on the daily runs of cup anemometers, percentage frequencies of hours with different ranges of velocity at 225 stations for which anemographic data were available and percentage frequencies of days with different durations of wind velocity greater than 6 m.p.h. at 15 stations, and diagrams showing the diurnal variations of wind velocity at 22 anemograph stations and the maximum wind pressures likely to be experienced in different parts of India. *Subject Headings:* 1. Wind velocity distribution 2. Diurnal wind velocity variations 3. Wind energy 4. India.—I.L.D.

11.2-224

551.553.11:551.524(548.1)

Ramakrishnan, K. P. and Jambunathan, R. (*both, Met. Office, Madras*), **Sea breeze and maximum temperatures in Madras**. *Indian Journal of Meteorology and Geophysics*, Delhi, 9(4):349-358, Oct. 1958. 5 figs., 4 tables, 7 refs. **DWB, DLC**—At coastal stations, in months when the temperature difference between land and sea is pronounced, a sea breeze starts a little before noon near the coast and gradually extends inland. When the general weather situation is not disturbed or changing fast, the arrival of the sea breeze is very sharp, being characterized by a rise in wind speed, a change in wind direction (unless the gradient wind is also from sea to land), a fall in the temperature of 2° to 3° and more striking than all these, a sharp rise in relative humidity of 10 to 30%, at times as much as 40%. Aerodrome stations, which are called upon to supply winds frequently, have to reckon the changes that may be caused by sea breeze. *Subject Headings*: 1. Sea breezes 2. Temperature effects on sea breezes 3. Madras, India.—*Authors' abstract*.

VERTICAL DISTRIBUTION AND SPECIAL WINDS

See also: Vertical wind velocity measurement (Huovila), 11.2-140.

11.2-225

551.555.3(494.4)

Bouët, Max, **Note sur le föhn**. [Note on föhn.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 138:102-103, 1958. **DLC**—Some facts relating to the incursion of föhn into the Rhone Valley are advanced on the basis of observations made simultaneously at Sierre (alt. 530 m) and Montana-Vermala (alt. 1510 m). East wind at 1500 m is a requisite but not sufficient condition for föhn appearance at 500 m. One observes a strong diurnal change in the föhn frequency at Sierre in connection with the diminution of the descent of air in the valley and the disappearance of the nocturnal inversion of temperature resulting from diurnal warming up. *Subject Headings*: 1. Föhn 2. Rhone Valley, Switzerland.—A. V.

WIND EFFECTS

See also: Wind effect on sea level (Weenink, Groen), 11.2-67; Wind stress on water (Lauwerier), 11.2-190; Wind energy, India (Ramdas, Ramakrishnan), 11.2-223; Shelter belt effects (Blüskova), 11.2-278.

11.2-226

551.556.8:551.465:532.59

Bascom, Willard, **Ocean waves**. *Scientific American*, New York, 201(2):74-84, Aug. 1959. figs. **DLC, DWB**—The mechanism of wind waves is described and illustrated. Historical work on wave theory, dating from FRANZ GERSTNER in Germany in 1802 and tank models of ERNST and WILHELM WEBER (also in Germany) in 1825 to SVERDRUP and MUNK's work in World War II at Scripps Institute of Oceanography are reviewed. Waves >45 ft high are quite common waves, 60-90 ft high are reported and one of 112 ft height was observed by LT. COMDR. R. P. WHITEMARSH on Feb. 7, 1933, when on board the tanker U.S.S. "Ramapo" enroute from Manila to San Diego (barom. 29.29, wind steadily rising 30-60 km for several days, period 15 sec., speed 55 kn). Shore effects on waves and wave effects on shores, refraction by underwater objects, tsunamis breakers, surf, tides and model basins are discussed and illustrated. *Subject Headings*: 1. Ocean waves 2. Wind waves at sea 3. Record wave heights 4. Tsunamis.—M. R.

UPPER AIR WINDS

See also: Geomag.-upper air wind relationships (Woodbridge, Davis), 11.2-91; Jet flights in lee waves (Georgii), 11.2-93; Upper air wind calculation (Farnham, Miller), 11.2-125; Wind vector calculation (Rouaud), 11.2-126; Jet stream analysis (Johannessen), 11.2-186; Jet stream variations (Yamamoto), 11.2-187; Upper wind pattern in cyclone (Shimizu), 11.2-193; Upper air wind effects on acoustical propagation (Rocard), 11.2-300.

11.2-227

551.557:519.27

Charles, B. N. (*Sandia Corp., Albuquerque, N. Mex.*), **On some limitations of upper wind records**. *Journal of Geophysical Research*, Wash., D. C., 64(3):343-346, March 1959. 3 figs., 5 refs. **DLC**—Some effects of low-elevation-angle terminations of electronic wind soundings

are indicated by statistics from two climatological projects. These effects bias mean values, standard deviations, and inter-level correlations. Examples are given, and the suggestion made that the climatic record of upper winds be routinely augmented by interpolated synoptic values. *Subject Headings:* 1. Upper air winds 2. Interpolation.—*Author's abstract.*

11.2-228

551.557.2/5:061.3

Eichenberger, W., *Congrès scientifique international sur les jet-streams et les ondes atmosphériques*. [International Scientific Congress on Jet Streams and Atmospheric Waves.] *Schweizer Aero-Revue*, Zurich, 34(8):507-508, Aug. 1959. DLC—Short account on the Congress organized by the Soaring Center of the Polytechnic School at Turin, and held there from June 4-6, 1959. The aim of this Congress, led by W. GEORGII, was the restatement of our present knowledge on the jet stream, and its application to aerial navigation. The theory of the setting of waves and turbulent zones has made important progress. Explanations are given on the forming of rotors at tropopause level and on a theory concerning the mechanism of the setting or dispersal of waves in a wind varying with time. Investigating the jet stream on a synoptic scale has been the subject of many works. *Subject Headings:* 1. Jet stream-atmospheric wave relationships 2. Jet stream effects on aerial navigation 3. International Congress, Turin (June 4-6, 1959).—A.V.

VERTICAL MOTION

See also: Jet flights in lee waves, Alps (Georgii), 11.2-93; Large scale motions (Fleagle), 11.2-182; Thermal convection (Pédelaborde), 11.2-183; Turbulence effects on lee waves (Förchtgott), 11.2-209; Lee waves (Lyra), 11.2-210; Lee wave equations (Merbt), 11.2-211; Turbulence and subsidence (McKay), 11.2-220.

11.2-229

551.541:551.558.21:532.59

Wallington, C. E. (*Met. Office, Dunstable*), A numerical study of the topographical factor in lee-wave amplitude. *Royal Meteorological Society, Quarterly Journal*, 84(363):428-433, Oct. 1958. 5 figs., 3 refs., 6 eqs. DWB, DLC—A numerical study of the effect of mountain shape on two-dimensional lee-wave shows that asymmetrical ridges are slightly more favorable than symmetrical profiles for the formation of lee waves, especially for short wave lengths. A technique is suggested for determining the lee wave length when only part of the lee-wave flow is observable. *Subject Heading:* 1. Lee wave calculations.—*Author's abstract.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY AND EVAPORATION

See also: Potential evapotranspiration (Mohrmann, Kessler), 11.2-24; Forest influences on evaporation (Wagenhoff, von Wedel), 11.2-103; Temp.-humidity relationships (Kashin, Gritsenko), 11.2-112; Vertical humidity distribution measurement (Huovila), 11.2-140.

11.2-230

551.571.1:551.574.1

Dufour, L. and Defay, R., *Étude thermodynamique de la pression de saturation par rapport à une gouttelette en suspension dans l'atmosphère*. [Thermodynamic study of the saturation pressure in relation to a droplet suspended in the atmosphere.] *Belgium. Institut Royal Météorologique, Publications, Ser. B*, No. 9, 1953. 20 p. 3 tables, 7 refs., 30 eqs. DLC—The basic equations for the thermodynamic equilibrium of a surface are analyzed with particular attention to the effect of curvature and the effect of dissolved sodium chloride in a water droplet. Numerical results are given. Furthermore the effect of adsorption on solid-liquid and liquid-gaseous interfaces is discussed. *Subject Headings:* 1. Cloud physics 2. Saturation vapor pressure.—A.A.

11.2-231

551.571.36:551.526.6(944)

Moss, J. M., A preliminary investigation of ocean temperatures and maximum dew points in the New South Wales region. (In: Australia. Bureau of Meteorology, Conference on

Estimation of Extreme Precipitation, Melbourne, April 1958. Melbourne, Dec. 1958. p. 127-148. 2 figs., 3 tables, 9 refs.) DWB (M77.31 C748c)—The potentialities of oceanic regions as modified by their associated ocean currents, are discussed as the source of supply of maximum moisture charges for air masses passing over them and affecting New South Wales. Available data is used to obtain tentative values of maximum dew points over ocean areas and their spatial and temporal distributions. The propriety of using land surface or coastal dew points in maximization studies is questioned, in view of their disparity with those of oceanic air masses, which could possibly reach New South Wales. *Subject Headings:* 1. Dew point maximum 2. Ocean temp.-dew point relationships 3. New South Wales.—*Author's abstract.*

CONDENSATION

See also: Dew obs. (Long), 11.2-127; Nuclei effects on elec. (MacCready), 11.2-156; Artificial cloud nucleation (Peterssen), 11.2-157; Saturation pressure effects on droplets (Dufour, Defay), 11.2-230; Icing of cumulus clouds (Flohn), 11.2-245; Bioclimatic aerosol research (Nüchel), 11.2-279.

11.2-232

551.574.1:546.48:546.15:778.5

Turnbull, David (*Gen. Elec. Res. Lab., Schenectady, N. Y.*), **Cinema on crystal growth.** (In: Conference on the physics of Cloud and Precipitation Particles, Sept. 1955, *Proceedings*. Pub. N. Y., Pergamon Press, 1957. p. 350-353. 3 figs., 2 refs.) DLC (QC921.5.U5), DWB—Description of a film based on experiments performed by JACK NEWKIRK at General Electric Research Laboratory. A saturated solution of cadmium iodide cooled so that hexagonal platelets precipitate. The platelets grew rapidly laterally without apparent thickening. If 2 plates accidentally meet, dislocation steps occur (illustration shows a spiral pattern of dislocation steps.) *Subject Headings:* 1. Ice crystal growth films 2. Meteorological films.—M.R.

11.2-233

551.578.41:551.574.1:536.421:546.212

Vick, F. A. (*Univ. College of North Staffordshire, Keele*), **The physics of water and ice.** *Science Progress*. London, 46(184):646-653, Oct. 1958. 8 refs. DLC—A review of the articles by several authors in *Advances in Physics*, No. 26, April 1958, which concern the anomalous properties of water and ice. B. J. MASON's studies of supercooling and nucleation of water and ice (see 9.11-235, Nov. 1958, *MAB*), and one on the growth of ice crystals from vapor and melt, are the principal articles of interest to meteorologists. *Subject Headings:* 1. Supercooled water 2. Nucleation 3. Ice crystal growth 4. Physics of water 5. Ice physics. I. Mason, B. J.—M.R.

11.2-234

551.574.1:551.464:551.594.25

Woodcock, Alfred H., **Salt and rain.** *Scientific American*, N. Y., 197(4):42-48, Oct. 1957. photos, table. DWB, DLC—Two processes of cloud droplet growth are described and illustrated: (1) Condensation on smoke or salt nuclei and collision with smaller droplets, and (2) freezing to form snow crystal which grow by coalescence. Raindrop size distribution in relation to salt particle size distribution, salt sampling techniques, the manner by which salt particles are ejected into the atmosphere from the sea (bubble bursting), and the electrical charges on droplets ejected from the sea (which process could account for most of the electrical charge in the atmosphere), and the ejection of plankton and other useful or harmful organic matter into the atmosphere by the same bubble-bursting mechanism, are also discussed and nicely illustrated. *Subject Headings:* 1. Cloud droplet formation 2. Sea salt nuclei formation 3. Bubble bursting mechanism 4. Electrical charges on sea salt nuclei.—M.R.

11.2-235

551.574.11:551.510.42

Georgii, Hans-Walter, **Ein Beitrag zum Grössenverteilungsgesetz des atmosphärischen Aerosols über dem Kontinent.** [A contribution to the size distribution law of atmospheric aerosols over the continent.] *Meteorologische Rundschau*, 11(1):33-34, Jan./Feb. 1958. fig., 6 refs. DWB, DLC—C. JUNGÉ established the following equation relating size and number of particles suspended in the atmosphere $dN/d \log r = \text{const.}/r^3$ where N = number of particles and r = radius of the particles. In this study the author reports the results of measurements of the size distribution of atmospheric aerosol in pure mountain air carried out at Kitzbühel in the

Tyrol. After the incursion of cold air the giant particles were almost entirely absent and the exponent of the size distribution law was 3.7. In subsequent days the size distribution flattened out, the aerosol aged and the exponent dropped to 2.6. This gradual change was accompanied by an increase in large particles and decline in the number of Aitken particles. These findings give an average of 3 as the exponent of the power law. Some recent studies of W. WIDLAND and of C. JUNGE on the size distribution of atmospheric aerosol are reviewed. The author concludes that a r^{-3} law of size distribution is to be expected in many phenomena where matter is dispersed in microscopic particles. *Subject Heading: 1. Aerosol size distribution.*—*I.L.D.*

11.2-236

551.574.11:551.510.42

Orr, Clyde, Jr.; Hurd, F. Kenneth and Hendrix, Warren P., **The study of the solubility and rate of solution of fine aerosol particles.** Georgia. Institute of Technology. Engineering Experiment Station, Contract AF 19(604)-1970, Scientific Report No. 1, Feb. 28, 1958. 48 p. 22 figs., 9 tables, foot-refs. **DWB (M74.1 G352sc)**—Investigations were made of the rates at which small particles (20 to 0.034 radius) of rather soluble materials such as NaCl re-establish equilibrium after sudden shifts in relative humidity. Largest-particle rates were determined photographically; changing times for the smallest sizes could not be measured with an ion counter as originally hoped, but were finally deduced from light scattering records. Relative humidity was switched between about 20% and saturation, therefore equilibrating times as measured approach maximum values. The compounds investigated include NaCl, $(\text{NH}_4)_2\text{SO}_4$, KI, KCl and LiOH. For submicron particles of these materials, equilibrating times were all less than one second, and for smaller than one-tenth micron radius particles, the times were in the millisecond range. The times were found to increase as particle solubility decreased. In normal meteorological processes the time for equilibration around NaCl ions, for example, is therefore, certainly not a factor; time may be important, however, in contrail formation and similar man-induced phenomena. Equilibration times for relatively insoluble compounds like AgI or PbI_2 will undoubtedly be much longer and possibly of importance in many meteorological studies; further investigation of less soluble compounds is recommended. *Subject Headings: 1. Soluble nuclei 2. Nuclei diffusion coefficients.*—*Authors' abstract.*

11.2-237

551.574.11:543.7

Twomey, S. (*CSIRO, Div. of Radiophy., Univ. Grounds, Sydney, Australia*), **The nuclei of natural cloud formation, Pt. 1, The chemical diffusion method and its application to atmospheric nuclei.** *Geofisica Pura e Applicata*, Milan, 43:227-242, May/Aug. 1959. 6 figs., 2 tables, 12 refs. English summary p. 227. Also: **Pt. 2, The supersaturation in natural clouds and the variation of cloud droplet concentration.** *Ibid.*, p. 243-249. fig., 2 tables, 2 refs., 11 eqs. English summary p. 243. **DWB, DLC**—Condensation nuclei which grow into droplets in natural clouds constitute only a small fraction of the total population of nuclei, since they must be activated at low supersaturations ($<1\%$). Such nuclei cannot readily be measured by the usual expansion methods. A chemical diffusion method is described in which water vapor and HCl vapor diffuse between a water surface and an aqueous HCl solution; this produces the continuous small supersaturations required to study these "cloud nuclei." Nucleus numbers are obtained photographically. Results of observations made by this method during the period April-August 1958 are presented and discussed; they suggest that the main source of cloud nuclei is the dry land surface. *Subject Headings: 1. Cloud nuclei 2. Chemical analysis of condensation nuclei.*—*Author's abstract.*

11.2-238

535.82:551.574.12

Bricard, J. and Deloncle, M., **Observation microscopique de gouttelettes d'eau éclairées latéralement.** [Microscopic observation of laterally illuminated water droplets.] *Annales de Géophysique*, Paris, 15(2):272-281, April/June 1959. 12 figs. French summary, p. 272. **DLC**—The aspect of a laterally illuminated water droplet is microscopically examined. A description is given of the conditions which make possible the microphotography of cloud droplets in suspension in the air. The process of the image construction is given. Three different images are observed, corresponding to the reflective light at the outer surface, directly transmitted by the droplet, and transmitted after two inner reflections. The authors calculate

the degree of illumination of these images basing on the results of WIENER. *Subject Headings:*
1. Cloud droplets 2. Microscopic observation of water droplets.—A.V.

11.2-239

551.574.2:551.509.616

Fuquay, Donald M. (*Res. Meteorologist, Munitalp Found.*) and Wells, H. J. (*President's Advisory Comm. on Weather Control*), **The Project Skyfire cloud seeding generator.** (In: U. S. Advisory Committee on Weather Control, **Final Report, 1957.** 2:273-282. 10 figs., 2 tables.) **DWB, DLC**—Cloud seeding generators used in Project Skyfire, which aim at preventing or eradicating lightning fires by suppressing lightning, require the production of enormous quantities of silver iodide nuclei and must be safe to operate in highly inflammable forests. The authors describe in detail with the aid of photographs, diagrams and graphs, the construction, operation, output, etc. of a specially designed silver iodide generator developed by the Skyfire Project. Silver iodide is dissolved in an acetone solution and sodium iodide is drawn from a reservoir through a modified hypodermic needle and nebulized by a cloud of propane gas. This moisture is directed into a flame chamber and ignited. "The volatilized AgI condenses into crystals as the smoke passes around a quench plate mounted above the flame chamber." The quenching action produces a larger output of crystals than an open chimney by limiting crystal growth. The characteristics, operation and nuclei production of other types of smoke generators, such as the string-burning type and acetone-burning generators, and the results of calibration of nuclei output are discussed. *Subject Headings:*
1. Silver iodide smoke generators 2. Project Skyfire.—I.L.D.

FOG

See also: **Sea fog, Antarctica** (Rubin), 11.2-52; **Fog forecasting, Friendship Airport** (Harrison), 11.2-152; **Fog effects on sunshine** (Grunow), 11.2-197.

11.2-240

551.575.1L551.591.36:629.13

Evans, E.; Aanansen, C. J. M. and Williams, T. E., **Deterioration of visibility in radiation fog.** *Meteorological Magazine*, London, 87(1028):33-35, Feb. 1958. 2 tables. Also: **Comment** by C. J. Boyden, and [**Reply by**] Evans and Aanansen, *Ibid.*, 87(1035):279-280, Sept. 1958. fig., ref. **DWB**—Statistical comparison of visibility frequencies under different conditions of radiation and duration of visibilities in various ranges under worsening conditions shows that there is no high percent of visibilities in intermediate ranges, and a definite bias in favor of low visibilities which persist during the cooling period in winter after radiation fog forms. Hourly data for 4 airfields in Suffolk, Lincolnshire and Shropshire for 1950-54, were carefully analyzed. It is concluded that in spite of the bias, there is still a tendency for visibility to get much worse rapidly, once it falls below 800 yds, though it may stay in the 800-1200 yd range and never get worse. **BOYDEN** points out that the statistics given do not provide any information about the changes in an individual fog. The data presented would seem to indicate that the percentage frequencies in fogs which became thick would have been lower for higher visibilities than the figures given. Also, the only figures apparently relevant to the behavior of an individual fog are the higher frequencies after the fourth hour in the 200-400 yds range. In reply, **EVANS** and **AANANSEN** state that in the table on frequencies of visibilities on radiation nights within consecutive 200 yd ranges, the data indicate that visibility does not often stop in intermediate ranges and that the high frequency in the 800-1000 yd range is due to all fogs passing through this range. *Subject Headings:* **1. Radiation fog duration frequencies 2. Visibility decadence 3. Fog forecasting 4. England.—M.R. and I.L.D.**

CLOUDS

See also: **Cloud photographs** (Mullock), 11.2-41; **Wave clouds** (Georgii), 11.2-93; **Convective cloud electrification** (MacCready), 11.2-156.

11.2-241

551.576:551.577:621.396.11

Gibson, J. E., (*Radio Astronomy Branch, Naval Res. Lab., Wash., D. C.*), **Some observations of microwave radiation from clouds.** U. S. Naval Research Laboratory, Memorandum

Report, No. 693, March 27, 1957. 4 p. "This is an interim report; work is being continued." DWB (M21.7 U585so)—Notes on possible sources of microwave radiation from cloud and precipitation cells. Attenuation of 0.86 cm waves by these cells, and passive locating of centers of activity by detection of microwaves emitted by cells which are electrified are two phases of the work in progress at NRL. *Subject Heading*: 1. Microwave radiation from clouds.—M.R.

11.2-242

551.576.1:778.3

Four stages in the history of a cumulonimbus cloud. *Weather*, London, 13(1):18-19, Jan. 1958. 4 photos (no text). DWB—Four photos of a large CuNb system at Brighton, Eng., Aug. 6, 1956, taken at close intervals, show development and decay of towers, etc. *Subject Headings*: 1. Cloud photography 2. Cumulonimbus development 3. Brighton, Eng.—M.R.

11.2-243

551.576.1:551.515.4(675)

Dessens, Henri, *Sur la formation d'orages par plissement d'une couche d'air humide*. [The formation of thunderstorms by deepening of a layer of humid air.] *Puy de Dôme. Observatoire, Bulletin*, No. 1:7-10, Jan./March 1959. 2 figs., 3 refs. DWB—During the dry season in the Belgian Congo, soundings show the presence above the ground of a humid layer 1200 m thick. This humid layer can fold. The variations of the thickness can easily be determined by aircraft, and they are due to cumulus cloud bands whose width may reach some kilometers and whose length is at least several tens of kilometers. In a region and during a season where a humid air layer at ground level is overlaid by dry air, waves are formed in the low humid layer. The corresponding local deepening of the humid layer permits thunderstorm development. *Subject Headings*: 1. Deepening 2. Cumulus cloud formation 3. Thunderstorm formation 4. Belgian Congo.—A.V.

11.2-244

551.576.11(213)

Ackerman, Bernice (*Univ. of Chicago*), *The variability of the water contents of tropical cumuli*. *Journal of Meteorology*, Boston, 16(2):191-198, April 1959. 7 figs., 5 tables, 18 refs. DWB, DLC—Continuous measurements of liquid-water content have been used to determine the magnitude of cloud water and its distribution in tropical cumuli. The average water content for a cloud penetration was always less than the amount computed for an air parcel ascending moist adiabatically from cloud base with no water loss. However, many clouds were found to have regions in which the measured liquid-water content exceeded the computed. The data show that the magnitude of the water content was correlated to the vertical displacement from cloud base and to the horizontal and vertical dimensions of the cloud. Cloud water was found to be unevenly distributed in a horizontal plane through the cloud. The location of the area of greatest water concentration appears to be related to the external wind field. *Subject Headings*: 1. Liquid water content of clouds 2. Tropical cloud studies.—*Author's abstract*.

11.2-245

551.576.11:551.574.7

Flohn, Hermann, *Ein Fall lokaler Vereisung von Cumuluswolken*. [Case of local icing of cumulus clouds.] *Germany. Deutscher Wetterdienst, Berichte*, 7(51):79-80, 1959. 6 refs. German and English summaries p. 79. DWB, DLC—An airplane observation of a sharp-edged local icing of cumulus clouds below a subsidence inversion is discussed (temperature at the top-level near -6°C ; Sept. 2, 1957, central Newfoundland.) *Subject Headings*: 1. Icing of cumulus clouds 2. Newfoundland.—*Author's abstract*.

11.2-246

551.576.31/32(791)

Sellers, William D., *The annual and diurnal variations of cloud amounts and cloud types at six Arizona cities*. *Arizona. Univ. Institute of Atmospheric Physics, Scientific Report*, No. 8, Sept. 1, 1958. 104 p. 16 figs., 6 tables, 8 refs., eqs. DWB—The annual and diurnal variations of cloud types and cloud amounts are described for six first-order weather stations in Arizona. These stations are Flagstaff, Winslow, Prescott, Phoenix, Tucson, and Yuma. Most of the data analyzed were obtained on punched-cards from the National Weather Records

Center at Asheville, N. C. The period of record was from Jan. 1, 1948 through Dec. 31, 1955. This information was supplemented by cloud amount data for the period from July 1, 1956 through March 31, 1958 taken from the supplement to the Local Climatological Data for the six stations. After a brief outline of the terrain features in the vicinity of the stations (Sec. II), the type, quantity, and quality of the data are discussed. Emphasis is put on the homogeneity of the records, both temporally at a single station and spatially from one station to another. In Sec. IV the annual variations of cloud amounts, cloud types, and thunderstorms are described, without any reference to the more detailed diurnal variations, which are discussed later, month by month, in Sec. V. Part of the summary (Sec. VI) is devoted to an investigation of the relation between the average cloud cover and the frequencies of occurrence of both clear and overcast skies at a "typical" Arizona city. *Subject Headings: 1. Annual cloudiness variations 2. Diurnal cloud variations 3. Arizona.—Author's abstract.*

11.2-247

551.576.4:551.576.11

Shinners, Willard (*Marine Observations, U. S. W. B.*), *Hints to the observer* [on] *Estimation of cloud heights. Mariners Weather Log*, Wash., D. C., 2(2):39, March 1958. DWB—Heights of convectively formed clouds, the cumulus and the stratocumulus, can be estimated closely by using the air temperature and dew point values. The method cannot be used to estimate heights of stratus, altocumulus, or cirrus. Under average conditions as a mass of air rises the actual air temperature cools 5.5°F for each 1000 ft. The cloud height formula developed and the final computation of same are given. *Subject Headings: 1. Cloud height estimates 2. Convective clouds.—N.N.*

PRECIPITATION

See also: Precip. availability, Hawaii, 11.2-17; Met. disasters, Japan, 11.2-22; Water deficiency (Mohrmann, Kessler), 11.2-24; Rainfall effects on agromet. (Thomas, Hildreth), 11.2-99; Forest effects on precip. (Friedrich), 11.2-106, 11.2-108; Forest-drought relationships (Friedrich), 11.2-109; Moving averages precip. (Uttinger), 11.2-123; Radioactive precip. (Jehanno et al.), 11.2-173; Radioactive precip. (Styra), 11.2-174; Rain removal of radioactive products (Lockhart et al.), 11.2-176; Microwave radiation from precip. cells (Gibson), 11.2-241.

11.2-248

551.577.3(79)

Lynch, Henry B. (*Consulting Engineer, 448 South Hill St., Los Angeles, 13, Calif.*), *Rainfall patterns along the Pacific Coast: variations in monthly rainfall*. Jan. 1954. 8 p. 4 tables, graphs, map. Typescript. DWB (M78.3 L987ra)—Rainfall data for 8 stations along the Pacific coast of the U. S. from Tatoosh Island, Wash. to San Diego, Calif. for 1881-1951 are tabulated and shown graphically as monthly totals and accumulated mass residuals, percentages, etc. in an attempt to show some regularity in seasonal or year to year patterns. These are said to change with some consistency in time and space. *Subject Headings: 1. Rainfall patterns 2. Precipitation trends 3. Pacific Coast.—M.R.*

11.2-249

551.577.37:551.311:631.4(43)

Kuron, H. (*Giessen*), *Kritische Regenintensitäten und Bodenerosion in Deutschland*. [Critical rainfall intensities and soil erosion in Germany.] *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept. 3-14, 1957, [Transactions]*, Vol. 1: p. 141-145, pub. 1958. 3 tables, 5 refs. English summary p. 141. DWB—Under the moderate climate conditions of Germany, rainfall intensities oscillate a great deal about the lower limit of intensity which causes soil erosion to begin. Therefore several secondary factors are also important for the development of this process. Such factors are chiefly: mechanical composition of soil, soil moisture at the beginning of the rainfall, structure of soil surface and its stability when wetted. During one rainfall short intensity peaks can influence remarkably the total erosion effect. Investigations of these relations in runoff and erosion measurements were conducted for several years on bare plots with slopes of 9 to 13%. Such slopes are widely spread in arable land areas of Germany. Best results were gotten for loess loam. Investigations on sandy silt loam (weathering of New Red sandstone) and slightly stony silt loam (weathering of slate) could be used for comparison. On plots with plant cover the relations

are still more complicated by root and shelter (interception) effects, which are governed by type and development of plants. *Subject Headings:* 1. Rainfall intensities 2. Soil erosion 3. Ger-many.—*Author's abstract.*

11.2-250

551.577.37(75)

*U. S. Weather Bureau, **Rainfall intensity-frequency regime, Pt. 3, The middle Atlantic region.** Its *Technical Paper*, No. 29 (Pt. 3), July 1958. 38 p. numerous figs., numerous tables, 14 refs. DWB—Presents rainfall intensity-duration-area-frequency regime, with other storm characteristics, for durations of 20 min. to 24 hrs, area from point to 400 sq mi., frequency for return periods from 1 to 100 yrs, for the region east of longitude 80°W. and south of latitude 41°N. *Subject Headings:* 1. Rainfall intensity duration frequencies 2. Middle Atlantic States.—*Author's abstract.*

RAIN, SNOW AND HAIL

See also: Avalanches (Roch), 11.2-36; Snow crystals and aerosols (Nakaya), 11.2-163; Coefficient of reflectivity of snow (Suga), 11.2-199.

11.2-251

551.578.46(988)

Bull, C. (*Physics Dept., Victoria Univ. of Wellington, New Zealand*), **Snow accumulation in North Greenland.** *Journal of Glaciology*, Cambridge, 3(24):237-248, Oct. 1958. 2 figs., table, 15 refs., 7 eqs. English and German summaries p. 237. DWB, DLC—Snow measurements conducted during the 1952-1954 British North Greenland Expedition are reported here. Traversing the Ice Cap 1200 km from Dronning Louise Land to Nunatarssuaq, the 1953-1954 accumulations were obtained by means of bamboo stakes between Farvel Nunatak and Northice to Camp B 73. The traverse is mapped and shown in cross section profile. The graphed and tabulated results show accumulation above 2220 m, between 2220-1850 m, and between 1400-1850 m to be 16, 14, and 8 gm cm⁻², respectively. The decrease is due to increase of the katabatic wind with lower altitude rather than precipitation difference. Values of mean accumulation from 19 rammsonde profiles taken from 1947-1953 are tabulated and shown to be 12.98±2.85 gm cm⁻² and 13.15±1.98 gm cm⁻² above 1800 m, for the eastern and the western half of the traverse. KOCH and WEGENER's data for 1913, by comparison, were 15.86±3.67 gm cm⁻² and 36.40±12.33 gm cm⁻², respectively. Danish precipitation records from coastal stations show no similar variation. The over-all mean accumulation on the ice cap is shown to be 29±3 gm cm⁻². *Subject Headings:* 1. Snow accumulation 2. Greenland.—W.N.

11.2-252

551.578.46:551.326.7(798)

Holtmark, B. E. (*U. S. Navy Elec. Lab., San Diego, Calif.*), **Insulating effect of a snow cover on the growth of young sea ice.** *Alaskan Science Conference, 3rd, Mt. McKinley National Park, Sept. 22-27, 1952, Proceedings*, pub. Sept. 1954. p. 104-105. DWB—Observations at Pt. Barrow, Alaska in the spring of 1949 showed that bare ice grew fastest and thickest (176 cm) and snow covered (2 m thick) ice the slowest and thinnest (117 cm) or a 50% increase in ice thickness where no snow cover existed. Careful controls were kept and the temperature at different levels, structure of ice, thickness, etc. were measured once a week. (For abstract on this title from another source, see 7G-207, July 1956, MAB.) *Subject Headings:* 1. Snow cover effects on ice thickness 2. Pt. Barrow, Alaska.—M.R.

11.2-253

551.578.463:551.324.22(494)

Kuhn, W., **Der Firnuwachs pro 1957/58 in einigen schweizerischen Firngebieten.** [Firn accretion during 1957-58 in some Swiss firn regions.] *Naturforschende Gesellschaft, Zurich, Vierteljahresschrift*, 103:334-343, Dec. 1958. fig., 13 tables. DLC, DWB—The hydrological year had normal precipitation amounts. The first three months (Oct.-Dec. 1957) had little snow, the deficit was filled up at the end of the winter and during the spring of 1958. The summer has given high temperatures and abundant sunshine; these conditions were the reason for the melting of firn-accumulation. The yearly increase was below the mean value. In the firn regions also the snow dispersion by wind contributed to this result. *Subject Headings:* 1. Firn 2. Firn accumulation 3. Switzerland.—A.V.

11.2-254

551.578.46(712.2)

Williams, G. P., **Analysis of snow cover characteristics at Aklavik and Resolute, Northwest Territories.** *National Research Council of Canada. Div. of Building Research, Research Paper*, No. 40, Sept. 1957. 5 p. 7 figs., 7 refs. DWB (M78.46 W723a)—Data for 1947-54 at Aklavik, Northwest Territories (68°14'N, 134°50'W) and Resolute (74°30'N, 95°40'W) on Cornwallis Island are analyzed to give graphs for each station showing: frequency of snow surface crystal shape, size and type of surface condition, of crystal size, density and hardness, variation of hardness, density and grain size with depth, average monthly hardness, density and grain size, and depth-time variations in the above, relation between density-hardness and temperature gradient. Climatic differences (e.g., wind variations), may account for differences in data at the two places which are >1100 mi apart. *Subject Headings:* 1. Snow cover characteristics 2. Snow density 3. Aklavik, Northwest Territory 4. Resolute, Northwest Territory.—M.R.

11.2-255

551.578.46(71)

Williams, Gaynor P., **Variability of physical characteristics of snow cover across Canada.** *International Union of Geodesy and Geophysics. Assoc. of Scientific Hydrology, Toronto, Sept. 1957, [Transactions], Vol. 4, pub. 1958.* p. 158-165. 4 figs., table, 4 refs. DWB, DLC—The results from a survey of the physical characteristics of snow cover across Canada have been summarized. Regional variation of snow density, snow hardness, and snow grain-size are shown graphically, as well as the probability values of extremes for these snow characteristics. *Subject Headings:* 1. Snow cover characteristics 2. Canada.—Author's abstract.

11.2-256

551.578.46(436.14)

Zawadil, R., **Die Bedeutung der Schneedecke für das Leben in der Grossstadt.** [The importance of snow cover for life in a large city.] *Wetter und Leben*, Vienna, 8(8/11):200-206, 1956. 2 figs., table, 6 refs. DLC—The effect of snow cover upon the daily routine of life in a large city such as Vienna is discussed with special reference to construction above the street surface, construction below the surface such as sewers, water pipes, etc. and the influence of snow cover upon various sport activities. The characteristics of the snow cover itself which are important in the aforementioned activities are considered; these include snow depth, mean interdiurnal variations of snow depth and frequency of rather large snow amounts. Numerical and graphical data are presented. *Subject Headings:* 1. Snow cover effects in cities 2. Snow cover properties 3. Vienna, Austria.—I.L.D.

HYDROMETEOROLOGY

See also: River discharge (Sokolovskii), 11.2-10; Storm runoff (Befani), 11.2-11; Floods, Europe (Weikinn), 11.2-16; Water resources, Hawaii, 11.2-17; Flood frequency data, W. Washington (Bodhaine, Robinson), 11.2-18; Flood forecasting, Japan, 11.2-22; Water balance (Mohrmann, Kessler), 11.2-24; Hydrologic surveying manuals (Il'in), 11.2-31; Hydrographic analysis of aerial photos (Kudritskii), 11.2-32; WMO and hydrology (Ashford), 11.2-42; Percolation measurement (Suzuki), 11.2-98; Forest hydrology (Penman), 11.2-102; Forest hydrology (Wagenhoff, von Wedel), 11.2-103; Forest hydrology (Wicht), 11.2-104; Insolation effect on snow melt (Miller), 11.2-105; Forest effects on water balance (Friedrich), 11.2-107; Forest effects on runoff (Friedrich), 11.2-108; Forest hydrology (Friedrich), 11.2-109; Forest hydrology (Nys), 11.2-110; Forest hydrology (Meyer), 11.2-111; Forest effects on runoff (Rutskovskii), 11.2-113; Runoff coefficient determination (Alekseev), 11.2-121; Runoff calculation (Rabukhin), 11.2-122; Runoff forecasting, Rhine (Church), 11.2-154; Soil temp.-moisture relationships (Gupalo), 11.2-205.

11.2-257

551.579:551.437(774)

*Ash, A. D.; Eichmeier, A. H.; Kidder, E. H.; et al., **Hydrologic studies of small watersheds in agricultural areas of Southern Michigan, Report No. 1, Sloan-Deer Creek basins.** *Michigan. Water Resources Commission, Lansing Hydrologic Studies of Small Watersheds . . . Report*, No. 1, June 1958. 77 p. 13 figs., 9 tables, 3 photos, 17 maps. DWB (M79.6 U584st)—A geological description of the Sloan-Deer basin, Mich. is given. The following small water-

shed areas were studied: Deer Creek near Dansville, Ingham County; Sloan Creek, near Williamston, Ingham County; Quaker Brook near Nashville, Barry County; and Sebewa Creek near Sunfield, Eaton County. Continuous recording precipitation and stream gaging stations were established in each basin to record the basin hydrologic data. Rainfall analysis and all the data are included in this preliminary report. *Subject Headings: 1. Watershed hydrology 2. Hydrologic data 3. Southern Michigan.—N.N.*

11.2-258

551.579:551.482(44)

Carzon, Jean (*Électricité de France*), *Monographie hydrologique du Verdon: résumé de l'étude présentée à la Société Hydrotechnique de France*. [Hydrological monograph on the Verdon River: summary of a study presented to the Hydrotechnical Society of France.] *Société Hydrotechnique de France, Paris, Mémoires et Travaux*, No. 2:103-114, 1958. figs., tables. (1957 Prix Henri Milon.) DWB, DLC—Morphological characteristics, precipitation, snow cover and evaporation and runoff regimes and water utilization in the Verdon River basin are described in detail and illustrated with data on rainfall in relation to elevation and distance from the sea (an empirical formula showing these relationships is developed), seasonal variations and intensity frequencies of precipitation, snow cover thickness as a function of elevation, average river runoff, its seasonal variations, extremes, etc. The Verdon River is the principal tributary of the Durance. Its hydrological regime is of particular interest because of karst phenomena and because of the fact that it traverses three distinctly different climatic regions. *Subject Headings: 1. River hydrology 2. River runoff 3. Verdon River, France.—G.T.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

See also: Applied climat. (Neuberger, Teweles), 11.2-30; *Improved documentation for climatic investigations* (Arléry), 11.2-39; *Dynamic climat.* (Pédélaborde), 11.2-184; *Bibliog. of Outstanding Textbooks and Technical Books of the Past Decade*, p. 265.

11.2-259

551.58:519.24

Thom, H. C. S. (*Office of Climatology, U. S. W. B.*), *A note on the gamma distribution. Monthly Weather Review*, Wash., D. C., 86(4):117-122, April 1958. 9 refs., 54 eqs. DWB, DLC. Also in manuscript form. Wash., D. C., U. S. Weather Bureau, Jan. 1958. 11 p. 8 figs., 39 eqs. DWB (M01.45 U587not)—A further development of the use of the incomplete gamma distribution and especially of the statistical estimators β and γ . It is shown that all values, or extreme values, may be used but the latter gives twice the variance or $\frac{1}{2}$ of the data are discarded. If the median is used, $\frac{1}{3}$ of the data are discarded. Maximum likelihood estimates sufficiency of the estimates and variance of the estimators are then treated. The gamma distribution is useful in studying rainfall (or other) distributions which have zero as a lower boundary and an infinite upper boundary. *Subject Headings: 1. Incomplete gamma distribution 2. Statistics in climatology.—M.R.*

CLIMATIC ZONES

See also: Latitude effects on climate (Schaufelberger), 11.2-273.

11.2-260

551.581:551.585(87)

Sánchez Carrillo, Jesus M. (*Chief, Meteorology Section, Natl. Inst. of Agri., Venezuela*), *Generalidades sobre climatología*. [Generalities on climatology.] Maracay (Venezuela), Instituto Nacional de Agricultura, Sección de Meteorología, Aug. 1953. 7 p. Mimeo. DWB (M82/87 V458g)—General factors including latitude, altitude, continentality; micro-climate, albedo; systems of classification (Köppen) and application to climates of Venezuela (tropical rainy, selva, step, humid warm) and, finally, Thornthwaite's system are elucidated. *Subject Headings: 1. Climatic types 2. Venezuela.—M.R.*

CLIMATE OF PARTICULAR PLACES

See also: **Monthly climatic summaries, Uruguay** (Battione Chiarino), 11.2-131.

11.2-261

551.582:551.585 (569.3)

†Baldy, Charles, **Contribution à l'étude climatique du Liban**. [Contribution to the study of the climate of Lebanon.] *Revue de Géographie de Lyon*, Lyons, 34(1):57-73, 1959. 6 figs., 20 refs., eqs. French summary p. 57. DWB—In the study of the climatic factors in Lebanon it has been found that the fifteen different types of climate in the country can safely be grouped regionally into six. In order to do this, it was necessary to arrive at some index for this classification and then compare the results with other countries of the world along the same latitude. Details of this investigation are given in this paper. *Subject Headings*: 1. **Regional climatology** 2. **Climatic classifications** 3. **Lebanon**.—N.N.

11.2-262

551.582 (798)

*Mitchell, J. Murray, Jr. (*Office of Climatology, U.S.W.B.*), **The weather and climate of Alaska**. *Weatherwise*, Boston, 11(5):151-160, Oct. 1958. 7 figs., 2 tables. DWB—A thorough and readable account of the various climatic or weather conditions in the 3 major climatic regions of Alaska, and in the state as a whole. Tables and charts show comparative temperatures of Alaskan stations with other parts of the Northern Hemisphere, and a comparison of temperature, precipitation, wind, cloud and fog data for 12 Alaskan stations. *Subject Headings*: 1. **Climate of Alaska** 2. **Alaska**.—M.R.

11.2-263

551.582(44)

Sanson, J., **Le climat de la France au cours de la décennie 1948-1957**. [The climate of France during the ten year period 1948-1957.] *Bulletin des Engrais*, Paris, No. 407:97-100, May 1958. chart, 2 tables.—In order to study the climate of France during the period 1948-1957, the author has subdivided the country into nine regions; within each of them he selected a station for its climate which seems to be the most representative for the considered region. Tables give for each one of those stations the seasonal and annual values of the precip., the temperature and sunshine duration for the ten years, with decennial means, and a comparison of these means with the normal values (1891-1930). The author notes 6 to 12% deficiency in precip. The mean annual for the period 1948-1957 is not more than 0.5° from the normal, either above or below, according to the region. The mean annual sunshine duration during these 10 years presents, with respect to the normal, a noticeable increase in west and central France, while it reveals a slight decrease in the east and extreme south. *Subject Headings*: 1. **Climatic data** 2. **Climatic evolution** 3. **France**.—A.V.

11.2-264

551.582(44)

Sanson, J., **Vue d'ensemble sur les dix derniers hivers (1948-1957)**. [General survey on the last ten winters, 1948-1957.] *Bulletin des Engrais*, Paris, No. 402:14-17, Dec. 1957. 4 tables.—Definition of the meteorologic winter, with a reminder of some chronicles of past centuries relating to severe cold weather occurring prior to the beginning of the astronomical winter. The annual and winter normals of temperature, sunshine and precipitation are given for several stations in France. The author gives the general characteristic features for the winters of the period 1948-1957 in France. He ends with some weather lore concerning the cold season, which are current in certain rural areas. *Subject Headings*: 1. **Climatic data** 2. **Winter anomalies (1948-1957)** 3. **Weather lore** 4. **France**.—A.V.

11.2-265

551.582.3(66)

*Walter, Heinrich (*Director, Botanical Inst., Stuttgart*), **Klimadiagramm-Karte von Afrika**. [Climagram chart of Africa.] Bonn, Ludwig Rohrscheid Verlag, 1958. 27 p. 46 figs., chart (fold.) in pocket, 12 refs. (*Deutsche Afrika-Gesellschaft e.V. Bonn, Schriftenreihe*, No. 4, 1958.) DWB (M82.3/6 W232kL)—A diagrammatic study is made of the climate of Africa, with a particular emphasis on the meteorological importance of two West African countries, Ghana and Nigeria. Data from almost every province is used in the presentation of the temperature-precipitation diagrams. The material contains an enlarged map of Africa showing the eight climatic belts of the continent and a general survey of the climatic factors in the

continent. *Subject Headings:* 1. Climagrams 2. Climate of West Africa 3. West Africa.—N.N.

CLIMATIC CHANGES

See also: CO₂ and climate (Plass), 11.2-162; Air mass effects on earth's rotation (van den Dungen et al.), 11.2-185.

11.2-266

551.583.1/2(443)

Sanson, J., *Tricentenaire météorologique*. [Meteorological tercentenary.] *Bulletin des Engrais*, Paris, No. 410:152-156, Sept. 1958. 2 tables—The thermometer, devised by GALILEO in 1595 and improved by his pupil SAGREDO was used for the first time in France in 1658, just three centuries ago. Review of the dates and circumstances which led, in France, to observations of rainfall, temperature and evaporation by means of instruments. A parallel is drawn between these numerical values, mentioned in tables (1688-1790) and the climatic observations made without instruments in the same period. *Subject Headings:* 1. Climatic data 2. Instrumental data 3. Historical period 4. Paris region, France.—A.V.

11.2-267

551.583.3(789)

†Murray, Keith F. (*Bureau of Vector Control, Calif. State Dept. of Public Health*), *Pleistocene climate and the fauna of Burnet Cave, New Mexico*. *Ecology*, Durham, N. Carolina, 38(1):129-132, Jan. 1957. table, 13 refs. DWB—Fossil fauna in Burnet Cave at 4600 ft on the east slope of the Guadalupe Mountains of southern New Mexico, gives evidence of climatic changes during past 7-8 thousand years (as per radiocarbon dating). Some of the species, dating back to late Wisconsin time (such as the marmot) are now confined to areas much farther north so that repopulation during glacial periods must have been in forest areas which during interglacial periods (as now) are desert. Types of forest probable during these stages are discussed. *Subject Headings:* 1. Pleistocene climate in New Mexico 2. Climatic changes 3. Burnet Cave, Guadalupe Mountains, N. Mex.—M.R.

11.2-268

551.583.14(494)

von Rudloff, Hans, *Die Klimapendelungen der letzten zwei Jahrhunderte in Mitteleuropa*. [Climatic changes during the last two centuries in Central Europe.] *Atlantis*, Zurich, 30(1):40-42, Jan. 1959. fig. DLC—The changes in the monthly or annual mean temperature in Central Europe, as they appear from long series of observations, are only of a transitory nature. Furthermore, they are confined to limited areas: a given month can be extremely cold in one part of Europe and relatively warm in another part. A similar statement is valid as regards precipitation. The author illustrates his statements with a table and a graph relating to observations made at Basel for two centuries (1756-1955). *Subject Headings:* 1. Climatic trends 2. Central Europe 3. Basel, Switzerland.—A.V.

11.2-269

551.583.3:546.26.02:539.16

†Ruhe, R. V.; Rubin, Meyer and Scholtes, W. H., *Late Pleistocene radiocarbon chronology in Iowa*. *American Journal of Science*, 255(10):671-689, Dec. 1957. 5 figs., 2 tables, 29 refs. DLC (Q1.A5)—New dates for major events in Iowa from 24,500 yrs B.P. to 6500 yrs B.P. were obtained by radiocarbon methods. Major post-glacial climatic and vegetation changes occurred at about 8100 and 6500 years B.P., the latter gully cycle following on a desiccation period (8100 to 6500 B.P.) was itself followed by a warm dry grassland climate (from 6500 to present). Spruce occurred at about 11,700 ± 250 years, and a deciduous transition at 8200 ± 200 years. Loess filled in the gulleys at about 6800 B.P. *Subject Headings:* 1. Pleistocene climatic change, Iowa 2. Iowa.—M.R.

MICROMETEOROLOGY

See also: Project Prairie Grass (Haugen), 11.2-23; Forest climat. (Friedrich), 11.2-106, 11.2-107, 11.2-108, 11.2-109; Forest climat. (Ovington), 11.2-117.

11.2-270

551.584.9:677.06

Reifferscheid, H. (*Offenbach*), *Wärmedurchgang durch Stoffe*. [Heat transfer through fabric.] *Meteorologische Rundschau*, Berlin, 11(1):38, Jan./Feb. 1958. 3 refs. DWB,

DLC—The heat retention capacity of cloth can be measured by the rate of cooling of a frigrometer enveloped with a given type of cloth. The relationship between heat loss and wind velocity is represented by a hyperbolic curve which is concave at low wind velocities and becomes convex at high wind velocities. During comparison of fabrics of different fibers the point of inflection depends upon the "roughness of the fiber." In the case of synthetic fibers it lies farther to the right at high wind velocities than in the case of wool or cotton. The roughness of a fiber and of the cloth made from it is of fundamental importance in heat transfer. For within the boundary layer close to the fabric heat transfer is molecular while in the adjoining air layer it is convectional. A comparison of four different fibers (sheep wool, synthetic wool, perlon and nylon) woven into similar fabrics showed the following characteristic curves: the curve for nylon and perlon resembled the theoretical curve obtained from Dorono's formula. The curves for natural and synthetic wool indicate a linear relationship between wind velocity and cooling through radiation, conduction and convection. Also insulation and the effect of water and perspiration upon synthetic fibers are discussed briefly. *Subject Headings:* 1. Heat transfer through natural fabrics 2. Heat transfer through synthetic fabrics 3. Clothing climates.—*I.L.D.*

11.2-271

551.584.9:677

Reifferscheid, H., *Messwerte und theoretische Überlegungen zum Wärmedurchgang durch Gewebe aus natürlichen und synthetischen Fasern*. [Measured values and theoretical considerations on the penetration of heat through material from natural and synthetic fibers.] *Frankfurt a.M. Universität. Meteorologisch-Geophysikalisches Institut, Berichte*, No. 6:66-68, 1956. 2 graphs, table, 10 refs. **DWB?**—Using the Davos frigrometer to measure the heat capacities of natural and synthetic fibers, the author studied the processes of heat transfer from the heated sphere through the textile into the surroundings. Heat loss by conduction and convection alone is considered. If the heat transfer number through the cloth is β and the heat transfer number to the air is α then $1/q = 1/\alpha + 1/\beta$ is the thermal resistance of the entire layer over the sphere; q is the cooling power for a temperature difference of 1°C measured with the frigrometer. If the value $1/q$ is corrected for wind influence (α depends upon wind velocity) then the curves obtained for different textiles are parallel to those for the naked curve. This is true for values of wind velocity greater than 50 cm/sec; below this value to zero, radiation acquires greater importance. The heat resistance $1/\beta$ determined from the difference of the heat loss from the naked and any clothed sphere remains constant. The thicknesses of the layer of molecularly transportable air corresponding to the heat resistance of individual textiles are computed and shown in a table. From the geometrical thickness of these textiles it is not possible to determine their heat resistance. Curves showing the heat transfer numbers of different textiles are presented. *Subject Headings:* 1. Clothing climate 2. Heat transfer through natural fabrics 3. Heat transfer through synthetic fabrics.—*I.L.D.*

CLIMATIC CLASSIFICATION

See also: North American deserts (Jaeger), 11.2-7; Climatic types, Venezuela (Sánchez Carrillo), 11.2-260; Climatic classification, Lebanon (Baldy), 11.2-261.

11.2-272

551.501:551.58 551.585

Sapozhnikova, S. A. and Terent'eva, T. M., *O tochnosti kompleksnykh klimaticheskikh kharakteristik i ee povyshenii pri ispol'zovanii dannykh za periody raznoi prodolzhitel'nosti*. [Accuracy of complex climatic characteristics and means of increasing it by using data for periods of varying lengths.] *Leningrad. Nauchno-Issledovatel'skii Institut Aeroklimatologii, Trudy*, No. 4:30-45, 1958. 7 figs., 6+2 tables. **DLC**—The authors examine the problem whether it is possible to obtain accurate climatological data by reducing the length of the climatological period to 10 and even to 5 years. In this study the accuracy of calculation of probability of air temperature for different wind directions was analyzed for periods of 56 years, 15 years (3 periods), 10 years (5 periods) and 5 years (11 periods). The mean temperature was computed also for 20 years (4 periods); the fundamental length serving as the basis of comparison was the 56 year period. Punch card data for the interval 1896-1943 for 1300 o'clock for December, January and February were used. An analysis of mean air tem-

perature for different wind directions at 1300 o'clock for the 56 year interval showed that wind direction influences air temperature in all three months. In the transition from Jan. to Feb. the difference between direction diminished gradually and at the same time the general temperature level of the winds of different directions altered. The temperatures of different wind directions of all three months was expressed as deviations from monthly mean temperatures, in order to exclude the effect of general level of temperature. The accuracy of air temperature during different wind directions for shorter periods was determined by comparing with one another the temperature deviations of different wind direction from the monthly mean temperature for short and long periods. It was found that beginning with the 15 year period random temperature errors for different wind directions for January were of the order and are even larger than the total of random and systematic errors obtained in computing temperatures for January from the mean deviation of the period Dec.-Feb. In the 56 year period (normal) and for 20, 15 and 5 year periods smoothed curves of actual and computed probabilities of temperature frequencies for different individual wind directions for January are presented. These showed large deviations from the normal in respect to frequency and computed probabilities. These probabilities of temperature deviations from the normal were compared with probabilities of deviation from the normal for all eight directions of the three winter months. The latter methods in which regular characteristics of temperature probabilities are levelled and both according to deviations from the normal and the mean differ little from the first method. As the period diminishes in length the random errors increase. The deviations from the norm is considerable for 15 year periods, and the periods of the same length vary in the accuracy of probabilities. *Subject Headings:* 1. Representativeness of long period records 2. Representativeness of short period records 3. Temperature probabilities 4. Wind effects on air temperature.—I.L.D.

11.2-273

551.581:551.585:631.4

†Schaufelberger, Paul, *Klima-, Klimaboden- und Klimavegetationstypen*. [Types of climate, of climatic soils and of climatic vegetation.] *Geographica Helvetica*, Berne, 14(1):35-43, March 1959. 2 figs., 5 tables, 18 refs. **DLC**—Study relating to the classification of climates. Author shows graphically that one has to distinguish two climatic fields independent of each other. 1) By plotting the amounts of rainfall in abscissa and the temperatures in ordinate, the factors of rain 40, 60, 100 and 160 subdivide the first climatic field into zones of arid, semi-arid, wet and very wet. 2) By plotting the latitudes on the x-axis and the temperatures on that of the ordinates, the latitudes 18, 36, 54 and 72 subdivide this second field into five horizontal climatic zones and the altitude limits in five vertical climatic zones. The latter are determined by latitude and annual temperature. For each of these altitude climates one can distinguish five moisture processes. Local climate is thus defined by zone, annual temperature and moisture. The types of climatic soils are forest soils normally drained and poor in alkali, and "washed out" soils of which the humus and nutrient content is determined by the moisture. The natural vegetation of these climatic soils is a forest, the vegetation association of which is once more determined by the zone to which it belongs and the annual temperature. *Subject Headings:* 1. Climatic classification 2. Latitude influence 3. Climatic soil types.—A.V.

11.2-274

551.585.5

Murzaev, E. M., *Fiziko-geograficheskoe raionirovanie aridnykh oblastei*. [Physical geographic classification of arid regions.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geog.*, No. 4:16-20, July/Aug. 1957. **DWB**—Both in the U.S.S.R. and abroad the classification of deserts and semideserts is not yet based upon accepted principles applicable to any gradation from the largest to the smallest taxonomic unit. On the continent of Asia the association of mountains with deserts complicates the physical geographic classification of arid lands. L. S. BERG classified the desert zone of Kazakhstan and of Central Asia and the semideserts of Kazakhstan on the basis of climatic and pedologic-botanical data, and subdivided deserts into four types on the basis of morphological characteristics of the relief and lithological properties of surface deposits. These criteria do not suffice for classifying such extensive deserts as those of Sinkiang and Mongolia. Accordingly also the zonal structure which depends upon such climatic indices as absolute amount of precipitation, time and intensity of precipitation, variation of evapora-

tion, annual temperature regime, radiational conditions, etc. must be considered. A third subdivision in the classification of arid regions is the analysis of large geomorphological elements and lithological properties of an area, which are mutually interdependent; this is illustrated by the example of the Dzungaria desert and the Tien Shan foothills. A fourth gradation of regional subdivision of deserts is completely morphological involving both macro- and micro-relief features. The regional division of the mountainous regions of the desert zones of Central Asia, the physical geographic factors forming natural regions in arid zones, and the application of a typological regional classification to arid zones are discussed. *Subject Headings: 1. Arid zone classification 2. Desert climatology.—I.L.D.*

11.2-275

551.585.5:551.1 (569.1,567)

†Wirth, Eugen, *Morphologische und bodenkundliche Beobachtungen in der syrisch-irakischen Wüste*. [Geomorphological and pedological observations in the desert of Syria and Iraq.] *Erdkunde*, Bonn, 12(1):26-42, Feb. 1958. 9 figs., 25 refs. English summary p. 26-27. **DLC**—In this comprehensive study of the physical geography of the Syrian and Iraqi desert, the author describes their present climatic characteristics, the role of climate in their formation and their paleoclimates as indicated by traces of Pleistocene humid climates. Climatically the Syrian desert resembles the deserts of North Africa. The summer temperatures reach absolute maxima of 45 to 50°C and in winter (December, January and February) frosts always occur. The daily and annual temperature differences also correspond to those of North African conditions. Precipitation resembles that of margins of the Sahara. In the most arid parts of Shamiya the mean annual precipitation is 50 mm and in the boundary areas it is 250 mm. The precipitation period is between November and April; two poorly marked maxima are present. The precipitation distribution in Shamiya differs essentially from that in North Africa in that the same amounts of rainfall near and far from the coast, near and far from the permanent streams, and near and far from the local erosion bases. Often the isohyets run across the geological formation boundaries. The evidence found in the Syrian desert indicating that during the Pleistocene not only cooler but also more humid conditions prevailed, is summarized. A map showing the annual distribution of precipitation in the Syrian desert is presented. *Subject Headings: 1. Desert climates 2. Geomorphology of arid lands 3. Syria 4. Iraq.—I.L.D.*

11.2-276

551.585.7:615.834(431.5)

Schulz, Leo (Braunlage), *Über einige meteorologische und biologische Gegebenheiten des Mittelgebirgsklimas*. [Some meteorological and biological characteristics of the climate of the Mittelgebirge.] *Annalen der Meteorologie, Medizin-Meteorologische Hefte*, No. 13:26-30, 1958. 18 refs. **DWB**—Using as an example the Harz Mountains, the longitudinal direction of which is at right angles to the prevailing atmospheric currents, the author describes the formation of a mountain climate and of local climates in individual orographic areas. A detailed account is given of weather types caused by anticyclonic and cyclonic situations, the characteristics and origin of föhn and wind blocking and their effects in winter, the characteristics of high pressure weather in summer and winter as manifested in mountains and valleys, etc. The weather characteristics of the Mittelgebirge as indicated by temperature, humidity and radiation are considered in relation to the value of this area as a health resort. *Subject Headings: 1. Mountain climates 2. Health resorts 3. Harz Mountains, Germany.—I.L.D.*

BIOCLIMATOLOGY

See also: Winter barley culture (Grahl, Thielebein), 11.2-95; *Endive culture* (Harrington et al.), 11.2-96; *Climate and crop yield* (Pintér), 11.2-97; *Weather and potato blight* (Raeuber), 11.2-101.

11.2-277

551.586:551.55:595.7

Haufe, W. O. (*Vet. and Med. Ent. Sec., Science Serv., Lethbridge, Alberta, Can.*), *Importance of air movement as a factor in mathematical expressions for biological response to environment*. *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 3, Zoological Bioclimatology), 1957. 2 p. **DWB**—The author points out that any mathematical expression

for the relation between physiological response and temperature-moisture balance in insects must include the influence of air movement, especially in correlations and experiments under natural conditions and that the development of adequate methods of measuring and recording air movement for purposes of biological research is necessary. The general problem of the statistical evaluation of the interaction of meteorological and biological elements and the role of wind on insect behavior are discussed with the aid of specific examples including horizontal, vertical wind gradient, etc. *Subject Headings:* 1. Wind effects on insect behavior 2. Insect microclimatology.—I.L.D.

11.2-278

551.588.6:551.556.2 551.524

Blüskova, D., *Vliianie na polezashtitnite gorski poiasi vŭrkhu temperaturata*. [Effect of shelter belts upon temperature.] *Khidrologiia i Meteorologiia*, Sofia, No. 1:64-76, 1959. 5 figs., 9 tables, 11 refs. Russian and English summaries p. 75-76. **DLC**—This article examines the influence of forest shelter belts on air temperature measured 0.5 m above the ground. A review is presented mainly of the data of the expedition made in June and July 1954 to Dobruja (Karvuna, Balchik county) where there is a system of forest shelter belts. Temperatures were measured both over vegetation and bare fields. The influence of shelter belts was found to be greatest in the morning and evening (up to 1-1.2). The belts do not create conditions for raising the temperature during the warm summer and spring days when there is vegetation between the belts. *Subject Headings:* 1. Forest shelter belts 2. Shelter belt effects on temperatures 3. Dobruja, Romania.—From author's abstract.

11.2-279

551.586:551.574.1:551.510.42

Nückel, H. (Germany), *Die Schwebstoffe in der Luft und ihre bioklimatische Bedeutung*. [Aerosols and their bioclimatic significance.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Netherlands, Vol. 2, (Pt. 1). 6 p. 1958. **DWB**—The author briefly describes the dynamic role of the lungs in filtering aerosol particles from inspired air and examines in detail the properties of the aerosol particles in air with special reference to their adsorption and deposition in the alveolar passage. One of the characteristics of aerosols is their suspension capacity, which is a function of weight and diameter (less than 10^{-9} gms and less than 5μ). The range of suspension particles is between 2μ and 5μ ; while the diameter of bioclimatically significant suspension particles varies only in 3 ten powers, their volume exceeds 9 ten powers; biologically this is important as the substance transport of a particle with a diameter of 5μ is a million times as great as that of a particle 5μ in diameter. The elimination of particles in the lung passages is a function of particle weight, air speed and curvature radius. Particles having perfect suspension (diameter less than 0.5μ) are subject to aging. These colloidal particles with their high external valences adsorb irritating gaseous substances (ozone, SO_2 , aldehydes, etc.) particularly during inversions. Radioactivity is distributed preferably upon suspension particles between 0.01μ and 0.5μ in diameter. The visibility of suspension particles or transparency of an aerosol is a function of particle size. A working program for bioclimatic aerosol research is outlined and possible procedures of investigation are presented. This program includes the following: determination of the nature of suspended particles characterizing various climatic types; nature of the interactions between particles and gaseous impurities in the various climatic types; importance of nature and amount of suspended particles of climatic types during radioactive contamination; daily and seasonal variation of particles as influenced by geologic and cosmic phenomena; observation of radioactive air masses during their intercontinental migration; development of suitable physical chemical methods for determining the chemical milieu of actual fogs; and recording of suspension particle composition and concentration in relation to their effect upon plants, animals and man. *Subject Headings:* 1. Aerosol deposition 2. Atmospheric pollution effects 3. Bioclimatic aerosol research.—I.L.D.

11.2-280

551.586:551.594.12/3:612.014.4

Dussert, A. (France), *Météorosensibilité*. [Weather sensitivity.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), 1957.

1 p. **DWB**—A general discussion of the significance of the electric field in human responses to weather conditions. The author asserts that he has obtained data showing that sudden and intense fluctuations in the electric field (100 volts/m) within a meter above the ground are the causes of pathological functioning and even of lesions in individuals who are either ill or disposed to illness. The fluctuations of the electrical field produces tides of negative or positive ions; when inspired with moist air these ions modify the electrical charge of blood colloids. The large electric oscillations and ionic tides occurring 24 or 48 hrs in advance produce the weather sensitive reactions. A method for measuring the ion content of expired air is described briefly. *Subject Headings: 1. Electric field effects on man 2. Ion content of expired air 3. Weather sensitivity.—I.L.D.*

11.2-281

551.586:796

Hentschel, G., *Sport und Klima*. [Sports and climate.] *Angewandte Meteorologie*, Berlin, 3(5):149-157, Sept. 1958. German summary p. 149. **DLC**—The complex of climatic factors affecting performance efficiency in sports is examined. The thermal complex involves the maintenance of heat balance of the body by facilitating heat loss to the surroundings. The difficulties in expressing by means of a single index, the combined action of radiation, evaporation, convection and conduction, and the determination of comfort and tolerance levels, are discussed. Brief accounts are given of effective temperature, equivalent temperature, cooling power, and sultriness. The second physiologically active complex is the short wave radiation of sun and sky, that is visible and ultraviolet light (photoactinic complex). To visible light a physiological rhythm effect is attributed, while ultraviolet radiation is endowed with a stimulating influence. The atmospheric chemical effect is a function of atmospheric pollution, which may reduce performance. The neurotropic complex involves the condition of the sympatheticotonic and vagotonic components of the autonomic nervous system. The effect of high altitude, marine climate, and moderate altitude upon the physiology (biochemistry and neurology) of the individual and upon athletic performance is discussed. The favorable influence of marine climate upon performance efficiency as compared with the unfavorable effect of high altitude climate is stressed. The exposure of the body and its performance in dry warm and moist warm climates and the relationship between sweating and acclimatization are discussed. *Subject Headings: 1. Climatic influences on sports 2. Sports climatology.—I.L.D.*

11.2-282

551.586:581.14

†Hesse, Walter, *Einfluss des Wärme- und Wasserhaushaltes auf das Pflanzenwachstum*. [Effect of the heat and water budget on plant growth.] *Germany. Deutscher Wetterdienst, Berichte*, 7(51):29-34, 1959. 23 figs., 26 refs. German and English summaries p. 29. **DWB, DLC**—The measuring methods of determining the heat- and water balance for the purpose of agricultural meteorology are discussed first. Experimental methods are checked as regards their adaptability for investigations of the crop climate. Using numerous measurements it is possible to demonstrate in the growth process of various cultivated plants the changes of the heat- and water balance caused by atmospheric factors. *Subject Headings: 1. Heat and moisture balance effects on plants 2. Plant growth 3. Biometeorology.—Author's abstract.*

ENVIRONMENTAL INFLUENCES

See: Forest hydrology (Penman), 11.2-102; *Forest hydrology* (Wagenhoff, von Wedel), 11.2-103; *Forest hydrology* (Wicht), 11.2-104; *Forest effect on snow melt* (Miller), 11.2-105; *Forest effects on precip.* (Friedrich), 11.2-106; *Forest effects on water balance* (Friedrich), 11.2-107; *Forest effects on runoff* (Friedrich), 11.2-108; *Forest effects on water balance* (Friedrich), 11.2-109; *Forest effects on runoff* (Nys), 11.2-110; *Forest-water relationships* (Meyer), 11.2-111; *Forest effects on runoff* (Rutkovskii), 11.2-113; *Forest effects on water balance* (Ovington), 11.2-117; *Forest effects on climate and water regime* (Hornsmann), 11.2-118; *Forest-climate relationships* (Hursh), 11.2-119; *Forest-water balance relationships* (Kirwald), 11.2-120.

MISCELLANEOUS

COSMIC INFLUENCES

See also: Solar physics (Kiepenheuer), 11.2-15.

11.2-283

551.590.21:551.524.3:551.461.2

Simojoki, Heikki, (*Finnish Met. Off., Helsinki*), **On the consideration of the double sunspot cycle in climatic investigations.** *Geophysica*, Helsinki, 6(1):25-29, 1957. fig., 2 tables, 6 refs. **DLC**—A graphical presentation of winter (December-March) temperatures at Stockholm from 1756-1950, heights of sea level at Swinemünde from 1811-1943 and relative sunspot numbers for 1756-1950 are used to demonstrate the close relation between the double sunspot cycle (22-23 years) or the "Haleperiod." The highest water in the Baltic, and the highest temperatures at Stockholm correspond with the double sunspot minimum, and the lowest water and coldest winters with or slightly later than the double sunspot maximum. Deviations from normal temperature and water height for sunspot minimum and maximum and for double minimum and maximum are tabulated. *Subject Headings*: 1. Solar-weather relationships 2. Sunspot effects on sea level 3. Long period records 4. Stockholm, Sweden 5. Swinemünde, Poland.—*M.R.*

11.2-284

551.590.24:551.510.535:551.594.12

Minnis, C. M. (*D.S.I.R. Radio Res. Station, Slough*), **Contribution to discussion on solar radiation.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W., (eds.), *Rocket exploration of the upper atmosphere*. London, Pergamon, 1954. p. 289-290. table.) **DWB**—Report of observations made in Central Africa during the total eclipse of the sun in 1952. Studies were made in Khartoum and Ibadan. In the totality belt where Khartoum is located, the bright strip on the west limb was uncovered 40 sec after the totality and the intrinsic intensity estimated at 30 times that of the uniform disk radiation. Ionospheric measurements in Ibadan indicated a maximum obscuration of 75%. The teams also measured the electron density at the E-peak at intervals of 4 min. They were able to derive the distribution of the sources of E-layer ionizing radiation over the disks. This distribution is closely linked with the process that causes coronal radiation. *Subject Headings*: 1. Solar eclipse observations 2. Ionospheric ionization during eclipse.—*N.N.*

11.2-285

551.590.24:551.510.535

von Klüber, H., **Beobachtungen der totalen Sonnenfinsternis vom 12. Oktober 1958 im Gebiet des Pazifischen Ozeans.** [Observations of the total solar eclipse of Oct. 12, 1958 in the Pacific Ocean.] *Die Naturwissenschaften*, Berlin, 46(14):34-42, July 31, 1959. 10 figs., 11 refs. **DLC**—Observation conditions of this eclipse (the third during the IGY) were particularly difficult because only eight small islands of the Pacific were located in the totality zone. On Atafu Island, a British expedition (Cambridge University) observed successfully the corona with a Fabry-Perot interferometer. At the same place a group from New Zealand (Carter Observatory) made photometric and polarimetric photographs of the corona. At Motu Kavata (Puka-Puka) the rocket group (under the leadership of H. FRIEDMAN) of the very important U. S. expedition was successful in firing five Nike ASP rockets during the eclipse in order to observe X-rays (in the wave length interval 8-14 Å and 44-60 Å) and Lyman- α radiation. Ionospheric observations were also made but optical observations were disturbed by clouds. Photographs of the flash spectrum from the ultraviolet region to $H\alpha$ ($\lambda 6562$) taken by Japanese observers on Suvorov Island are among the most important observations of this eclipse. Some observations were also made in Chile just before sunset. Details concerning eclipses in 1961, 1962 and 1965 are also given. *Subject Headings*: 1. Solar eclipse (Oct. 12, 1958) 2. Sun's corona 3. X-ray radiation 4. Lyman- α radiation 5. Ionospheric observations.—*A.V.* ⑤

VISIBILITY

See also: Radiation fog effect on visibility (Evans et al.), 11.2-240.

11.2-286

551.588.7:551.591(421)

Bonacina, L. C. W. and Carter, C. I., Summer evening visibility over London in 1958. *Weather*, London, 14(4):135-136, April 1959. table. **DWB, DLC**—In 1958 unusually good visibility prevailed almost all summer, owing to the great amount of turbulence attending an unusually rainy season interspersed with periods of good weather. Comparative data for May, June, July and Aug. for 1950 through 1958 show the number of cases of good evening visibility over London and a comparison is made of visibility from Hampstead towards and away from London showing remarkable agreement or lack of any marked deterioration of visibility over the metropolitan area. *Subject Headings*: 1. Visibility over London 2. Urban influences on visibility 3. London, Eng.—*M.R.*

OPTICAL PHENOMENA

See also: Atmos. optics, Dumont d'Urville (Weill), 11.2-48.

11.2-287

551.593.51

Poncelet, Lucien, A propos du rayon vert. [The green flash.] *Ciel et Terre*, Brussels, 75(1/2): 25-27, Jan./Feb. 1959, 3 refs. **DLC**—Comments relating to two observations of the green flash made in Belgium. Succinct explanation of this not easily observed atmospheric optical phenomenon. It seems that Belgium offers the most opportunities to observe this short-lived phenomenon after the passage of an active cold front followed by anticyclonic forming of polar air in the vicinity of Ireland. *Subject Heading*: 1. Green flash—*A.V.* ©

11.2-288

551.593.51

Visser, S. W., Belangrijke waarhemingen van de groene straal. [Important observations of the green flash.] *Hemel en Dampkring*, 57(3):57-59, March 1959. 4 color prints. **DWB, DLC**—Discussion of D. J. K. O'CONNEL's recently published book: *The green flash and other low sun phenomena* (see 10.5-7, May 1959, *MAB*), which reveals entirely new aspects of this phenomenon. The author gives a review of the contents and the instruments used. He summarizes his impressions as follows: the green flash phenomenon includes much more than the "ray" which one thinks to see with the naked eye. Long before this supreme moment, the green flash develops in extremely narrow edges at the upper side of the sun. The photos give many convincing examples. But never a real green flash of light is developing (in opposition to the International Clouds Atlas W.M.O., 1956: "Flashes up to an altitude of several degrees have sometimes been observed"). *Subject Heading*: 1. Green flash.—*A.V.* ©

11.2-289

551.593.55

551.521.326:546.33

†Blamont, J. E. (*Ecole Normale Sup., Paris*); Donahue, T. M. and Stull, V. R. (both, *Univ. of Pittsburgh, Pa.*), The sodium twilight airglow 1955-1957, Pt. 1. *Annales de Géophysique*, Paris, 14(3):253-281, July/Sept. 1958. 14 figs., 4 tables, 20 refs., 43 eqs. **DLC**—An analysis of twilight observations on atmospheric sodium made at the Observatoire de Haute Provence during 1955, '56 and '57. During 1955 and '56 these show a preponderance (factor 1.43) of sodium west of the observatory near the Atlantic Ocean as compared with those of the east. Large changes in the ratio W/E could occur in the space of twelve hours and a high ratio be maintained for a week or more. Agreement with a theory of resonance absorption in the telluric layer is found leading to a deduction from curve shapes of abundances varying between 2×10^9 and more than 30×10^9 atoms/cm². Minimum values occur in summer, maxima in November-December and March. The influence of a Doppler effect for the solar D lines and the unsymmetrical east-west distribution on the morning-evening ratios of intensities are discussed. *Subject Headings*: 1. Sodium twilight airglow 2. Twilight observations of atmospheric sodium 3. Seasonal variation of atmospheric sodium 4. Haute Provence, France.—*Authors' abstract.*

11.2-290

551.593.55

551.521.326:546.33

Blamont, J. E. (*Ecole Norm. Sup., Paris*); Donahue, T. M. and Weber, W. (both, *U. of Pittsburgh, Pa.*), The sodium twilight airglow 1955-1957, Pt. 2. *Annales de Géophysique*,

Paris, 14(3):282-304, July/Sept. 1958. 6 figs., 8 tables, 2 refs., eqs. **DLC**—Twilight measurements discussed in a previous paper (see 11.2-289 above) are analyzed to determine the height and vertical distribution of sodium. Since measurements are made in three directions for each twilight they can yield information about the height of the sodium and the distance between the sodium and screening layers separately. However, care must be exercised to correct the observations for multiple scattering, the instrumental solid angle and azimuth setting. The measurements then yield 87.9 ± 0.4 km for the average altitude of the sodium layer and 29.5 ± 0.8 km for the screening layer. A correlation between ozone and sodium altitude is found and evidence for a tendency of both layers to be higher when the intensity is higher. A study of the shape of the cut-off at the end of twilight indicates that the sodium layer is usually about 14 km wide but narrower in the evening than in the morning. *Subject Headings: 1. Sodium twilight airglow 2. Sodium layer height 3. Sodium distribution.—Authors' abstract.*

11.2-291

551.593.55:535.33

Dufay, M., *Sur l'émission des raies H et K du calcium ionisé dans le spectre du ciel crépusculaire.* [The emission of H and K lines of ionized calcium in the twilight sky spectrum.] *Annales de Géophysique*, Paris, 14(3):391, July-Sept., 1958. fig., 3 refs. **DLC**—Observation made during July, 1956, at the Haute Provence Observatory (France) and in the course of 1957 in Adélie Land, of the H and K lines of ionized calcium emitted in the twilight spectrum. These observations bear out VALLANCE JONES' hypothesis according to which calcium could be carried to the high atmosphere by meteorites, the crepuscular excitation occurring afterwards through optic resonance. *Subject Headings: 1. Twilight sky spectrum 2. Ionized calcium emission 3. Haute Provence, France 4. Adélie Land, Antarctica. I. Jones, Vallance.—A.V.*

ELECTRICAL PHENOMENA

See also: Elec. phenomena, 11.2-1; Sail plane protection against atmos. elec. (Zielinski), 11.2-92; Equipment for forecasting lightning danger (MacCready), 11.2-150; Convective cloud elec. (MacCready), 11.2-156; Elec. charges on sea salt nuclei (Woodcock), 11.2-234; Elec. field effects on man (Dussert), 11.2-280; Ionos. ionization during eclipse (Minnis), 11.2-284.

11.2-292

537.56

551.594.12

Silverman, S. M., *Processes for the production and removal of electrons and negative ions in gases.* *U. S. Air Force. Cambridge Research Center, GRD Research Notes*, No. 16, June 1959. 17 p. refs., eqs.—Processes for production of electrons in that atmosphere (photoionization, photodetachment, preionization, and collisional detachment), and for removal of electrons (radiative attachment, attachment to neutral molecules, radiative recombination, dissociative recombinations and ion-ion recombination) are discussed with reference to recent work in each of these processes and lines for further research. *Subject Headings: 1. Ion production processes 2. Ion removal processes 3. Atmospheric ionization processes 4. Ionospheric ionization.—M.R. ©*

11.2-293

551.594.221:629.13

Pierce, E. T. (*Vickers Group Res. Establishment*), *Thunder and lightning.* *Shell Aviation News*, London, No. 246:9-13, Dec. 1958. 4 figs., 2 photos. **DWB**—Description of BENJAMIN FRANKLIN's experiment made in June 1752, and importance of the part played by visual observation in determining the proportion of lightning flashes that go to earth. Basic ideas and diagrammatic representation of the fundamental phenomena of atmospheric electricity are presented. Distinction is made between fair weather conditions and disturbed weather conditions. Atmospheric electricity creates disturbances in aviation (charging of aircrafts) and in wireless communication. The author reviews these various effects and disturbances and draws attention to the fact that studying terrestrial lightning flash constitutes a valuable tool in the exploration of the space immediately adjacent to the earth. *Subject Headings: 1. Atmospheric electricity 2. Thunder and lightning.—A.V.*

AURORAS

See also: Auroral research (Rouquet, Vassy), 11.2-166; Bibliog. of Outstanding Textbooks and Technical Books of the Past Decade, p. 265.

11.2-294

551.594.5:550.388.8

Abbott, W. N., Displacements of the radiant point during the auroral disturbance of September 22, 1957. *Canadian Journal of Physics*, Ottawa, 36(6):643-648, June 1958. 4 figs., 2 tables, 7 refs. **DWB, DLC**—Three detailed photographs of the corona on a well-defined star field taken during the display of Sept. 22, 1957, at College, Alaska, render possible determination of the position of the radiant point and measurement of its displacements. The photographs cover an interval of 21 min. and the measured displacement assumed to be continuous, divided by this interval gives an average rate of motion of about 12 min. of arc per minute of time. The variation of the magnetic elements in the same interval is such as to indicate displacements of the magnetic zenith which, viewed from ground level, appear unrelated to the displacements of the radiant point. *Subject Headings*: 1. Auroral drift 2. Auroral-magnetic relationships.—*Author's abstract*.

11.2-295

551.594.5

Aurores boréales 1959. [Aurora borealis, 1959.] *L'Astronomie*, Paris, 73(4):181-182, April 1959. **DLC**—Short description of two auroras observed in northern France and England during the night of Feb. 28-March 1st, 1959 and the evening of March 28, 1959. Both were rapid and short-lived auroras, low on the sky line and unobservable in towns owing to their suddenness and short duration. *Subject Heading*: 1. Auroral observation.—*A.V.* ©

11.2-296

551.594.5

Heybrock, W., Das Nordlicht vom 29-9-57 bis in die Südostschweiz beobachtet. [The aurora of Sept. 29, 1957, observed in southeastern Switzerland.] *Die Sterne*, Leipzig, 34(3/4):88, 1958. **DLC**—The aurora during the night of Sept. 29, 1957 at 21h was observed in the S.E. of Switzerland; the sky was illuminated as by a big fire. The center of the aurora was also seen from the Julier pass in the Graubünden canton and was normally situated in the magnetic northern direction. The maximum of the phenomenon was observed at 23h50 by the Sonneberg Observatory. *Subject Headings*: 1. Auroral observation 2. Switzerland.—*A.V.*

11.2-297

551.594.5:550.388:621.396

Hoffmeister, C. and König, Hermann, Nordlicht-Beobachtungen auf der Sternwarte Sonneberg der Deutschen Akademie der Wissenschaften. [Observations of auroras at the Sonneberg Observatory of the German Academy of Sciences.] *Die Sterne*, Leipzig, 34(5/6):125-126, 1958. **DLC**—Review of the observations of auroras during the night of March 1-2, 1957 at 23h40 and during the night of June 30-July 1, 1957 at 23h. The first notice of increase of solar activity and visibility of the auroras was given by Moscow. The Göttingen Geophysical Institute registered a magnetic storm during the night of June 30-July 1, 1957. Transatlantic radiocommunications were interrupted. The aurora was also observed at Bonn University. *Subject Headings*: 1. Auroral observation 2. Magnetic storms 3. Radiocommunications.—*A.V.*

11.2-298

551.594.5:778.3

Isaev, S. I., Podgotovka k issledovaniyam poliarnykh siianii v Murmanske. [Preparations for the study of auroras at Murmansk.] *Akademiia Nauk SSSR. Mezhdunarodnyi Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyi Biulleten'*, No. 3:86-87, 1957. fig. **DLC**—Thirty-four stations situated in high geomagnetic latitudes of Antarctica, Arctic, Murmansk, Yakutsk, Cape Chelyuskin, etc. have been equipped with special (large) wide-angle photo cameras (C-180) for photographing auroras. One of these cameras installed at the Murmansk branch of the Scientific Research Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation of the Ministry of Communication U.S.S.R. (M. O. MIZMIR) was tested in March 1957 at Murmansk. More than 3000 photographs of auroras of various intensity, cloud conditions and of other weather peculiarities were made. Films of auroras taken every minute and ionograms were obtained (latter was

carried out at the automatic panoramic ionospheric station). A two-month course for the training of observers for polar stations of the Northern Sea Route, attended by 20 students, took place in February–March 1957. *Subject Headings: 1. Auroral photography 2. Murmansk, U.S.S.R.—A.M.P.*

ACOUSTICAL PHENOMENA

11.2-299

551.596.1:551.551.5

Jorand, M. (C.N.R.S.), *Contribution à l'étude de l'amortissement des sons dans l'atmosphère libre*. [Contribution to the study of sound damping in the free atmosphere.] *Journal de Mécanique et de Physique de l'Atmosphère*, Paris, 1(1):43-47, Jan./March 1959. (Successor to *Journal Scientifique de la Météorologie*.) ref. French, English and Spanish summaries p. 44. DWB—Having shown that all the classical theories do not necessarily succeed in giving the values of the damping coefficient of sound similar to those found experimentally, it is demonstrated that the introduction of a coefficient of turbulent viscosity variable with the scale considered permits the derivation of theoretical results which are in accordance with those obtained experimentally. *Subject Headings: 1. Sound propagation 2. Atmospheric damping 3. Turbidity effects on sound propagation.—Author's abstract.*

11.2-300

534.2 534.5:551.524.7:551.557:551.596.1

Rocard, Yves, *Propagation atmosphérique à longue portée des signaux acoustiques puissants*. [Long range atmospheric propagation of strong acoustic signals.] *Académie des Sciences, Paris, Comptes Rendus*, 248(22):3131-3132, June 1, 1959. ref. DWB, DLC—Strong waves bend in the atmosphere—the larger amplitude the larger the bend. According to this it is shown that the strong sound-wave resulting from a nuclear explosion is aided in propagation by bending along the earth's surface, overcoming the unfavorable curvatures that could be produced for instance through a distribution of temperature and winds opposed to propagation. Under the same conditions, a weaker explosion is not audible as a consequence of its deficiency in amplitude so that it does not provide a corresponding bend. Even if a favorable distribution of temperature and wind gave it nearly the same trajectory, the increase of mean free path of the molecules in the air prevents the maintenance of too short wave lengths. *Subject Headings: 1. Acoustical propagation of strong acoustic signals 2. Atmospheric influences on acoustical propagation 3. Nuclear explosions waves.—A. V.*

11.2-301

551.596.1

Rosenbaum, J. H. (Shell Devel. Co., Houston, Tex.), *A note on the propagation of a sound pulse in a two-layer liquid medium*. *Journal of Geophysical Research*, Wash., D. C., 64(1):95-102, Jan. 1959. 4 refs., 17 eqs. DLC—The contribution from the branch line integral in Pekeris' formulation of the propagation of explosive sound in a two-layer liquid medium is investigated. It is shown that there is no net contribution to the solution in terms of pressure amplitude measured in the upper layer, which decays less rapidly than r^{-2} . The horizontal range, designated by r , is large compared with the depth of the layer. This result is applicable to early arrival pressure signals and is in agreement with recently published model experiments. *Subject Heading: 1. Acoustical propagation in liquids.—Author's abstract.*

11.2-302

534.6:551.596.1

Schwirzer, Th., *Akustische Messgeräte*. [Acoustical measuring instruments.] *Zeitschrift für Instrumentenkunde*, Brunswick, 67(9):223-231, Sept. 1959. 15 figs., 14 refs.—Survey of the most important acoustical measuring instruments commercially available in the German Federal Republic. The characteristic data are listed and critically examined to enable mainly the nonspecialist to choose the most suitable instrument for a certain field of application. Finally, suggestions for improvement are made to the industry manufacturing the measuring instruments. *Subject Heading: 1. Acoustical instruments.—A. V.*

PART II. BIBLIOGRAPHY OF OUTSTANDING TEXT AND TECHNICAL BOOKS OF THE PAST DECADE

By: *Malcolm Rigby*

INTRODUCTION

In the January 1960 issue we published a selected bibliography of about 100 of the most significant reference works (compendia, major textbooks, atlases, glossaries, etc.) which have come to our attention during the past 10 years. In this issue we are presenting a selection of 160 or more outstanding textbooks or works which would be considered of primary value as teaching aids rather than strictly as reference tools. At least a dozen of the works listed in the January compilation are repeated here owing to their importance both as reference and as teaching aids. These are:

1. Godske, Bergeron et al., **Dynamic Meteorology and Weather Forecasting**, 11B-51
2. Petterssen, S., **Weather Analysis and Forecasting**, 11B-110
3. Kochin, Kibel' and Roze, **Theoretical Hydrodynamics**, 11B-75
4. Alisov, Drozdov and Rubinshtein, **Kurs Klimatologii**, 11B-2
5. Mitra, S. K., **The Upper Atmosphere**, 11B-100
6. Shuleikin, V. V., **Fizika Moria**, 11B-129
7. Störmer, Carl, **The Polar Aurora**, 11B-135
8. Byers, H. R., **General Meteorology**, 11B-27
9. Scherhag, R., **Neue Methoden der Wetteranalyse und Wetterprognose**, 11B-124
10. Baur, F., **Physikalisch-statistische Regeln für Wetter- und Witterungsvorhersagen**, 11B-10
11. Brooks and Carruthers, **Handbook of Statistical Methods in Meteorology**, 11B-23
12. Gumbel, E. J., **Statistics of Extremes**, 11B-55
13. Hutchinson, G. E., **Limnology**, 11B-61
14. Charlesworth, J. K., **The Quaternary—Glaciation**, 11B-32
15. Prokof'eva, I. A., **Atmosfernyi ozon**, 11B-114

A few other works should be considered especially outstanding both for reference and as textbooks.

1. Geiger, R., **The Climate Near the Ground** (German and English ed.), 11B-50
2. Defant and Defant, **Physical Dynamics**, 11B-37
3. Ambartsumian, **Theoretical Astrophysics**, 11B-3

It will be noted that a few of the following works were published prior to 1950, and on the other hand, a few published in 1958 and 1959, are not included. Since several of these recent texts have come to our attention in the past few weeks, it is obvious that many more, especially of those published in distant countries, will not reach us for some months or even years.

Complete coverage of technical books in peripheral or related fields (e.g., oceanography, hydrology, astrophysics) is not attempted. Nor have we tried to cover the many elementary, popular or even lower grade college textbooks on meteorology and climatology (of which only a few have been included). In some future issue we will list 200 or 300 of these nontechnical works for the benefit of those who have need for this useful type of material.

Finally, we wish to express appreciation for the devoted and expert assistance rendered by Mrs. Dorothy M. Gropp and Miss Mary L. Rice in cataloging, checking, revising, combining and editing many of the bibliographic entries, especially for the complicated entries such as those involving translations, several volumes or several editions, and to Mrs. Mary Denny for hours spent in typing and retyping material as it was revised or updated.

In the following outline, authors have been included for identification purposes only; initials and co-authors have, in most cases, been omitted for the sake of brevity.

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11B-1

§ Ångström, Anders, *Meteorologi*. [Meteorology.] Stockholm, Albert Bonniers Förlag, 1957. 285 p. 115 figs., tables, 12 refs., eqs. DWB (M:629.13 A112me)—A standard, but up-to-date, elementary text in meteorology and climatology, obviously intended for aviation students in Sweden, but with considerable new and original material and many original sketches and photographs. The 21 chapters cover: atmosphere, weather, energy exchange between earth and atmosphere, temperature, moisture, cloud, precipitation, frost and glaze, visibility, fog and haze, pressure, pressure-wind relationships, squalls, convection and turbulence, cyclones and anticyclones, general circulation, thunderstorms, synoptic analysis and forecasting, aerological charts, aviation forecasting, instruments and methods and, finally, climate. Numerous climatic diagrams for individual places all over the world show seasonal temperature and rainfall regimes. The subject index gives a good key to Swedish meteorological terminology. (Same item as 10.10-10, Oct. 1959, MAB.) Subject Headings: 1. Aeronautical meteorology textbooks 2. Swedish language.—M.R.

11B-2

*† Alisov, Boris Pavlovich; Drozdov, O. A. and Rubinshtein, E. S., *Kurs klimatologii*. Chast' 1-2. [Course in climatology, Pt. 1-2.] Leningrad, Gidrometeoizdat, 1952. Pt. 1, Obshchaya klima-

- Klimatologiya (Kostin and Pokrovskaya), 11B-81
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551.5:629.13(02)

551.58(02) 551.584(02)

tologiia. [General climatology.] Pt. 2, **Metody klimatologicheskoi obrabotki nabludenii.** [Methods for climatological processing of observations.] 487 p. (both parts paged continuously). 162 figs., 6 charts (fold. at end), 134 tables, 135 refs. Also: Alisov, B. P.; Berlin, I. A. and Mikhel, V. M. **Chast' 3, Klimaty zemnogo shara.** [Pt. 3, Climates of the earth.] issued 1954. 320 p. (Collation continued from Pt. 1-2) figs., 163-232. charts 7-16 (laid in pocket), tables 135-281, 90 refs. (see 6.11-5.) Pt. 1-3, **DLC** (QC981.A483), **DWB** (M8 A414 Ku). Transl. of Pt. 1-2 into German with title **Lehrbuch der Klimatologie.** [Textbook of climatology.] Issued Berlin, Deutscher Verlag der Wissenschaften, 1956. 535 p. 160 figs., 6 plates (fold.), numerous tables, 137 refs. Reviews of the German translation by C. E. P. Brooks in *R.M.S., Q.J.*, 38(356):282, April 1957. Review by H. E. Landsberg in *A. M. S., Bull.*, 38(8):498-500, Oct. 1957. Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Sec. B*, 8(3/4):442-444, 1958.—These two volumes comprise the best advanced course in climatology from all points of view to appear in the past decade. Ch. I deals with the history of climatology, followed by an excellent treatment of solar radiation and its effect on the heat balance, etc.; Ch. II deals with the influence of the oceans and continents on climate and life; Ch. III with the effect of general and local circulation factors on climate (including air mass, frontal and synoptic climatology); Ch. IV devotes a few pages to climatic zones and types; Ch. V, influences of relief on climate; VI, microclimate; VII, climatic change; VIII, artificial changing of climate; IX, smoothing and homogenizing records; X, compiling data summaries for specific elements; XI, analyzing and synthesizing microclimatic, heat balance, ship, aerological and synoptic data. The second volume goes on to discuss: XII, major influences in climates of U.S.S.R.; XIII, climate of the rest of Europe; XIV, Asia (except USSR); XV, Africa; XVI, Indonesia and Australia; XVII, North and Central America; XVIII, South America; XIX, Arctic and Antarctic; XX, Atlantic, Pacific and Indian Oceans; XXI, climate of free atmosphere (general and regional). Appended is a good bibliography, original charts of radiation and radiation balance, pressure, wind frequency, temperature anomalies, and cloud cover. The German translation is for Pts. I and II. Pt. III has not been translated. (Same item as 4.8-1, 9.7-13 and 11A-16, *MAB.*) **Subject Headings:** 1. Climatology textbooks 2. Microclimatology textbooks.—*M.R.*

11B-3

523.03(02)

*†Ambartsumian, Viktor Amazaspovich (*ed.*), **Theoretical astrophysics.** Transl. from the Russian by J. B. Sykes. N. Y., Pergamon Press, 1958. 645 p. 75 figs., 36 tables, 183 refs., numerous eqs. Index of names, p. 636-638 with variant transliterations of Russian names. **DLC** (QB461.A583). Also: Ambartsumian, Viktor A. and Mustel', E. R. (*eds.*), **Theoretische Astrophysik.** Berlin, VEB Deutscher Verlag der Wissenschaften, 1957. 644 p. 75 figs., 36 tables, 81 refs., numerous eqs. (*Hochschulbücher für Physik*, ed. by F. X. Eder and Robert Rompe, Vol. 27.) **DLC** (QB461.A585). Also: Ambartsumian, Viktor A. (*ed.*), **Teoreticheskaia astrofizika.** Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoi Literatury, 1952, 635 p. 75 figs., 36 tables, 81 refs., numerous eqs. **DLC** (QB461.A58)—The present English translation of the original (1952) Russian text has been revised and brought up to date by the authors. It is intended for graduate students of astrophysics and related disciplines. Pts. I, II and III (p. 1-399) by E. R. MUSTEL' deal with the theory of continuous spectra absorption lines in spectra of stars, and the physics of the sun (photo phase, granulation, convection, electrodynamics of the sun's atmosphere, sunspots and faculae, prominence, chromosphere, flocculi, flares, corona and radio emissions of the sun). Pts. IV through IX deal with: Planetary nebulae, novae, stars with bright spectral lines, the internal structure of stars, the scattering of light in planetary atmospheres, and interstellar matter, respectively. Chs. IV, V and VI are by V. V. SOBOLEV, Pt. VII by A. B. SEVERNYI, and Pts. VIII and IX by V. A. AMBARTSUMIAN. On p. 565-572 (Ch. 34) is a theoretical and empirical treatment of planetary atmospheres (especially their albedo) and absorption bands. A good bibliography, a table of constants and a subject index are appended. The Russian and German editions contain only 81 refs. mostly to Russian work up to 1954 whereas the English edition contains twice as many references to both native and foreign work through 1955. (Same item as 9.10-9, Oct. 1958, *MAB.*) **Subject Headings:** 1. Astrophysics textbooks 2. Theoretical astrophysics 3. Solar physics. I. Mustel', E. R. II. Severyni, A. B. III. Sobolev, V. V. IV. Sykes, J. B. (*transl.*).—*M.R.*

11B-4

551.5:63(02) 551.582(439.1)

*Aujeszký, László; Berényi, Dénes and Béll, Béla, **Mezőgazdasági meteorológia: Az agrometeorológiai ismeretek kézikönyve.** [Agricultural meteorology: an agrometeorological handbook.] Budapest, Akadémiai Kiadó, 1951. 550 p. 300 illus., refs. **DLC** (S600.A8)—This work comprises a useful handbook of meteorology, climatology and their agricultural applications, especially for those working on Central European crop ecology. In Pt. 1 (p. 15-271) basic information on meteorological elements, meteorological research, atmospheric dynamics, climatology and world climate is presented. A special section deals with the climate of Hungary (illustrated with numerous climatic charts). Pt. 2 (p. 275-417) deals with atmospheric phenomena and climatic factors from the point of view of their effect on the development of plants; with weather requirements of plants at various

stages of their development, with microclimate and with the utilization of meteorological information for agricultural purposes. Pt. 3 (p. 421-541) contains data on the ecology of 17 principal crops grown in Hungary. It also includes a chapter on the dependence of growing climate on soil properties and one on forest climate. The use of this extensive study as a reference book is facilitated by a subject index. (*Same item as 5.1-1, Jan. 1954, MAB.*) *Subject Headings:* 1. **Agrometeorological textbooks** 2. **Climate of Hungary** 3. **Plant ecology** 4. **Hungary.**—G.T.

11B-5

551.510.5(02)

†Aujeszky, László, **A légkör fizikája**. [Physics of the atmosphere.] Budapest, Akadémiai Kiadó, 1957. 286 p. 107 figs., 17 tables, bibliog. p. 273-275. DWB (M10 A923Le). Review by Kálmán Kenessey in *Időjárás*, Budapest, 61(6):456-459, Nov./Dec. 1957. (English translation of the review, *Ibid.*, p. 478-480.) Aujeszky's **Comments on Kenessey's Review**, and Reply by Kenessey, *Ibid.*, 62(1):53-55, Jan. 1958.—This is the third and last volume of a series of works on general geophysics dealing with the earth's interior (Vol. 1), the hydrosphere (Vol. 2) and the atmosphere (Vol. 3). As the author states in his foreword to Vol. 3, atmospheric phenomena have never been treated in a book from the point of view of their relation to the more general phenomena of the physics of the earth. Such a treatment is the purpose of this volume. In keeping with this objective, some subjects which would merit separate chapters in a conventional meteorological textbook (atmospheric optics and acoustical instruments) have not received separate treatment. The author attempts to outline the general laws of physical phenomena in the atmosphere, and their relations to other geophysical phenomena, rather than dealing with all the details of the various atmospheric processes. In the first two chapters (p. 13-133), he describes the structure and composition of the atmosphere in general and each atmospheric region in particular, also the physical processes taking place in the different regions. The most significant portion of the book is contained in Ch. 3 (p. 135-250). Here the author takes up atmospheric interactions with the hydrosphere and lithosphere. He discusses these by the various meteorological elements involved, namely, temperature (heat balance of the atmosphere, hothouse effect, dilation and contraction and their effects on the weathering of geological material, temperature effects on solubility in liquids, on wave formation and on evaporation); wind (general information on atmospheric circulation, wind waves, wind-produced water level variations, wind currents, wind erosion); clouds and precipitation (physics of clouds, formation and growth of cloud particles, precipitation formation, erosion, formation of river systems, glacial denudation, avalanches); electrical phenomena (electricity of fair and stormy weather, effects of lightning upon the electromagnetic field [possible effects of field changes upon living organisms], and upon atmospheric composition); and behavior and effects of volcanic and cosmic matter in the atmosphere. The fourth and last chapter is devoted to paleoclimates. A list of some 90 textbooks and monographs carefully selected from the best general and special works in international meteorological literature is added. *Subject Heading:* 1. **Atmospheric physics textbooks** —G.T.

11B-6

551.5(02):378

*Averkief, M. S., **Meteorologija**. [Meteorology.] Moscow, Izdat. Moskovskogo Universiteta, 1951. 384 p. 266 figs., 73 tables, 19 refs., eqs. DLC (QC861.A8)—This book covers in detail in the separate chapters of Pt. I: 1) atmospheric structure, 2) pressure, density, 3) radiation, 4) soil and water temperature, 5) heat transfer and temperature in surface layers of the atmosphere, 6) thermodynamics of the atmosphere, 7) lapse rates, inversions, air masses, 8) evaporation and humidity, 9) condensation processes, 10) precipitation and snow cover, 11) kinematics and dynamics of wind, 12) special winds, 13) cyclogenesis, fronts and anticyclones, 14) general circulation, 15) local storms and weather. Pt. II is on instruments and methods of observation of: 16) pressure, 17) temperature of soil, air and water, 18) radiation, 19) evaporation and soil moisture, 20) clouds, fog, visibility and turbidity, 21) precipitation and snow cover and, finally, 22) wind. Most of the equipment and instruments used in Russia are illustrated and records shown. Schematic diagrams are scattered profusely throughout the theoretical sections. The text is intended for geography students in universities. (*Same item as 3.9-1, Sept. 1952, MAB.*) *Subject Heading:* 1. **Meteorology textbooks** 2. **Teaching of geography.**—M.R.

11B-7

551.574.1(02):551.510.42

*Avy, Alban Paul (*Lab. Central des Services Chimiques*), **Les aérosols**. [Aerosols.] Pref. by C. Drouard. Paris, Dunod, 1956. 292 p. numerous figs. and tables, foot-refs. DWB (M74.1 A969ae)—A technical or engineering type of text covering theory and applications of theory and measurements of five particular aerosols. The first part deals with general properties of particles and their measurement (gravity, Brownian movement, diffusion, form, density, vapor pressure, evaporation, electricity, effect of heat, light, etc.), and then particulate clouds (dispersion, formation, coagulation, ultra-sonic effects, instruments, observation, counting, etc.). Pt. II deals with applications to problems of industrial hygiene, removal of industrial dust, military applications, at-

mospheric pollution and, finally, meteorological applications and vice versa (cloud and fog formation, artificial precipitation, atmospheric electricity, optical phenomena), and fumigation of crops and forests, dust explosions and unsolved problems. (*Same item as 10.10-14, Oct. 1959, MAB.*) *Subject Headings:* 1. Aerosol textbooks 2. Micromeritics 3. Cloud physics 4. Atmospheric pollution.—M.R.

11B-8

551.5:63:581.5(02)

*†Azzi, Girolamo (*Perugia Univ., Prof. of Agric. Ecology*), **Agricultural ecology**. London, Constable & Co., Ltd., 1956. 424 p. 47 figs. (incl. photos), numerous tables, bibliog. p. 403-415, numerous eqs. DWB, DLC (S589 A913). Review in *Geofisica e Meteorologia*, Genoa, 4(3):60, May/June, 1956.—In 1947 the author published his *Ecologia Agricola* in Spanish (see 2.4-180, April 1951, MAB). The present work is the first of its kind in the English language. The broad and the specific aspects of climate and soil in relation to growth and yield of crops are covered in the 27 chapters, divided into 4 main parts: I, Agricultural climatology; II, Soil-climate complex; III, Yield and ecology of cultivated plants; IV, Statistical analysis of yields in relation to climate, etc. The concepts and methods of agricultural meteorology, microclimatology, phenology, statistical analysis of crop growth and yields, etc., are covered under Pt. I. Specific crops in various parts of the world (wheat, grapes, rice, apples, peanuts, potatoes, etc.), their specific diseases (rust, blight . . .) are considered in some detail. The 13 page bibliography is arranged by chapters and contains a great number of the author's papers, many references to Italian, Russian and German articles in this field and a few references to American or English works, through 1955. The extensive author-subject index gives an idea of the wide range of crops, regions and subjects covered. (*Same item as 8.3-5, March 1957, MAB.*) *Subject Headings:* 1. Agricultural ecology textbooks 2. Agricultural meteorology 3. Translations.—M.R.

11B-9

551.501.81(02) 551.510.62

†Battan, Louis J., **Radar meteorology**. Chic., Univ. of Chicago Press, 1959. 161 p. tables, eqs., numerous figs. and foot-refs. On verso of t-p.: University of Chicago Committee on Publications in the Physical Sciences. DWB (M01.81 B335ra), DLC (QC973.5.B3)—A well edited and illustrated textbook giving details of basic and recent knowledge of radar, its applications to meteorology and to air navigation, intended especially for the nonradar meteorologist. Separate chapters are included on: 1) principles of radar; 2) properties of electromagnetic waves; 3) propagation of em-waves (index of refraction, tropospheric refraction, effect of curvature of ray paths, anomalous refraction and meteorological conditions associated therewith); 4) radar detection of spherical particles (scattering, Mie and Rayleigh scattering, total scattering and absorption cross-section); 5) scattering by melting spheres and nonspherical particles, polarization of energy; 6) attenuation by gases, clouds and hydrometeors; 7) use of radar for quantitative precipitation measurement; 8) distortion of echoes due to finite pulse length and beam widths; 9) application of radar in hydrology; 10) in cloud physics research (precipitation, hail, bright band, snow trails, generating lines, cloud seeding); 11) in mesometeorology (thunderstorm, squall lines, lightning, tornadoes); 12) air borne weather radar (for avoidance of turbulence, hail, icing and mountains); 13) in large scale systems (hurricanes, precipitation patterns in cyclones and in convective systems; 14) angels; 15) instrumental techniques (isoecho contours, turbulence, Doppler radar, chaff wind measurements, polarization techniques and constant-altitude presentations of echoes). Good author and subject indexes are provided. (*Same item as 11.1-11, Jan. 1960, MAB.*) *Subject Headings:* 1. Radar meteorology textbooks 2. Tropospheric radio wave propagation 3. Weather radar.—M.R.

11B-10

551.509.33(02)

*†Baur, Franz, **Physikalisch-statistische Regeln als Grundlagen für Wetter- und Witterungsvorhersagen**. [Physical-statistical rules as bases for forecasts for weather and weather character.] Vol. 1, pub. Frankfurt a.M., Akademische Verlagsgesellschaft MBH, 1956. 138 p. 30 figs., 72 tables, bibliogs. (65 refs.), eqs. Vol. 2, pub. 1958. 152 p. 23 figs., 60 tables, bibliogs. Foreword, table of contents, headings in text in German and English in both vols. Parts of Ch. 6 and 10 of Vol. 2 accompanied by English transl. DWB (M09.3 B351p). Reviews of Vol. 1 as follows: By J. M. Craddock in *Royal Meteorological Society, Quarterly Journal*, 83(355):136-137, Jan. 1957; F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 9(4):529-531, 1957; H. Trenkle in *Die Umschau*, Frankfurt a.M., 57(13):414, July 1, 1957. Review of Vol. 2 by M. Teich in *Zeitschrift für Meteorologie*, Berlin, 12(9/10):313-314, Sept./Oct. 1958.—The first of these two volumes on medium and long range forecasting presents in textbook form the basic principles worked out over the last 35 years by the world-famous author and his "school." The connection between solar activity and Grosswetter is treated statistically in great detail and with a critical evaluation and practical hints, plus useful tables and correlographs. Vol. II gives rules for monthly and seasonal forecasts based on terrestrial observations, seasonal changes, singularities in circulation types in Europe, the Atlantic and Eastern North America. (*Same item as 8.11-2, Nov. 1957, and*

10.7-3, July 1959, *MAB.*) *Subject Headings:* 1. Long range forecasting textbooks 2. Statistical bases for forecasting 3. General circulation studies 4. Grosswetter 5. Singularities.—*M.R.*

11B-11

631.43 (02)

*†Baver, Leonard David (*Dir., Experiment Station, Hawaiian Sugar Planters Assoc.*), *Soil physics* 3d ed. N. Y., John Wiley, 1956. 489 p. 105 figs., 65 tables, 81 eqs., bibliog. at end of each ch. **DLC** (S591.B3 1956), **DWB**—The various meteorological factors which affect soil structure, moisture productivity or erosion, such as temperature, rainfall, evaporation, wind, pressure, etc., are given; prominent place in the text, tables, charts, etc. of the appropriate chapters. Ch. IV of this textbook takes up various aspects of soil-water systems; Ch. V, Soil structure; Ch. VI, Soil air; Ch. VII, Soil moisture; Ch. VIII, Irrigation; Ch. IX, Drainage; Ch. X, Soil temperature; Ch. XI, Physical properties of soil and tillage, and Ch. XII, Erosion by water and wind and the role of the soil in the hydrologic cycle. Good bibliographies appear at the end of each chapter. (*Same item as 8.3-8, March 1957, MAB.*) *Subject Headings:* 1. Soil physics textbooks 2. Soil moisture 3. Soil erosion 4. Soil temperature.—*M.R.*

11B-12

551.508.822 (02)

†Beelitz, Paul, *Radiosonden*. [Radiosondes.] Berlin, VEB Verlag Technik, 1954. 136 p. numerous figs. (incl. photos), 19 tables, 85 refs., 21 eqs. **DLC** (QC876.B42)—This book represents an attempt to summarize technical knowledge of this important subject up to 1954. The treatment is very systematic. Pt. 1 deals with methods of upper air observation (from ground and from aircraft); Pt. 2, aerological measurements, temperature, humidity, pressure, upper air winds; Pt. 3, distant recording techniques (types of radiosonde telemetering and rocket-radiosondes); Pt. 4, aerological balloons (rubber, hydrogen, etc.); Pt. 5, balloon radiosonde ascents (calibration, ground checks, release, evaluation, wind aloft measurements with radiosondes, recovery of radiosondes); and Pt. 6, evaluation of upper air observations for synoptic forecasting. A good bibliography is appended. Technical details are shown in diagrams, photos, etc. The historical sketch on aerological soundings going back to FRANKLIN (1752) and ESPY (1834) and their kite experiments, or to even earlier balloon and mountain measurements, is quite valuable. Recent innovations such as electric hygrometers, latex and other synthetic balloons, rocket and parachute soundings, radar and acoustical soundings are mentioned. (*Same item as 7.1-8, Jan. 1956, MAB.*) *Subject Headings:* 1. Radiosonde textbooks 2. Upper air observation 3. Instrument textbooks.—*M.R.*

11B-13

551.509.3:551.579:551.46 (02)

Belinskii, Nikolai Alekseevich, *Morskii gidrometeorologicheskie informatsii i prognozy*. [Maritime hydrometeorological information and forecasting.] 2d ed. rev. Leningrad, Gidrometeorologicheskoe Izd-vo, 1956. 253 p. 60 figs., 16 tables, eqs. **DLC** (QC994.B4 1956)—The second edition of this manual or textbook on forecasting ocean waves, currents, temperatures, freezing and thawing in Arctic, water and heat balance and ice movements, has been amplified and revised so that it contains 90 more pages than the first edition (1950) (*see 3.2-46, Feb. 1952, MAB*). New sections present statistical or empirical methods of calculating or forecasting the water balance, calculating water temperature and location of ice in the open sea, the forecasting of water temp. in the N. Atlantic for autumn and winter, etc. Numerous objective forecasting graphs and nomograms are included. Theory is not neglected. A resume of the history of the marine forecasting service and the details of that service in the U.S.S.R. are presented. (*Same item as 9.5-11, May 1958, MAB.*) *Subject Headings:* 1. Oceanographic forecasting textbooks 2. Hydrologic forecasting.—*M.R.*

11B-14

551.5 (02)

*†Belinskii, V. A., *Dinamicheskaiia meteorologiiia*. [Dynamic meteorology.] Moscow, OGIZ, 1948. 703 p. 162 figs., 57 tables, 40 refs., numerous eqs., 23 append. **DLC** (QC880.B37)—Contains many schematic diagrams and models. This monumental text comprises an exhaustive, theoretical treatment of many aspects of dynamic meteorology, including hydrodynamics, thermodynamics of an ideal gas, of the water phase, of moist air; atmospheric statics (physics of a stationary atmosphere), stability; radiation; the equations of motion in the atmosphere, steady state motions, geostrophic winds in a laminar atmosphere, pressure changes, discontinuity surfaces, kinematics of a baric field, turbulence exchange, structure of turbulence spectrum, change of wind with height in a turbulent atmosphere, energy of atmospheric motions, general circulation of the atmosphere, atmospheric disturbances and their theoretical movements; KIBEL's method of forecasting (theoretical), (23 p.); vertical temperature distribution, radiative equilibrium, diurnal and seasonal effects, transformation of air masses. The appendices contain many extensive, useful tables of physical constants, units, etc. for astronomical, solar and terrestrial phenomena (water vapor and ice, composition of the atmosphere, adiabatic conditions, radiation, Coriolis and isobaric units and molecular constants). (*Same item as 2.6-7, June 1951, MAB.*) *Subject Headings:* 1. Dynamic meteorology textbooks.—*M.R.*

11B-15

551.465(02)

*†Berezkin, Vsevolod A., **Dinamika moria**. [Dynamics of the sea.] 2d ed. Sverdlovsk, Gidrometeoizdat, 1947. 683 p. 341 figs., 109 tables, 17 tables in append. numerous eqs., bibliog. p. 616-622. **DLC** (QC201.B4 1947)—Oceanography from the point of view of a Navy hydrographer. Contains three exhaustive chapters on (1) Waves, (2) Tides and (3) Currents, with a 60 page appendix giving extensive tables of harmonic analysis and other tables for calculation of tides anywhere on earth. Over 6 pages of references, both from native and foreign literature, on the subject of waves, tides and currents in the sea. (Same item as 2-183, Feb. 1950, MAB.) *Subject Headings:* 1. Ocean currents 2. Hydrography 3. Dynamic oceanography textbooks.

11B-16

551.5(02)

†Blair, Thomas Arthur and Fite, Robert C., **Weather elements: a text in elementary meteorology**. 4th ed. rev. by R. C. Fite. Englewood Cliffe, N. J., Prentice-Hall, 1957. 414 p. 145 figs., 5 tables, numerous refs., bibliog. p. 379-384. **DLC** (QC861.B58)—This standard and popular textbook on elementary (college) meteorology has gone through 3 editions since 1937, when the first edition appeared. Because of the large number of innovations that have occurred since World War II, it was necessary to considerably revise the old work in order to incorporate these developments. Some of the new material involves discussion or elaboration on topics such as: the jet stream, cloud seeding, the tropopause, thunderstorm and tornado prediction, facsimile map transmission, numerical weather prediction, carburetor icing, lee waves, hail, private weather services, etc. There are chapters on aviation and weather, electrical and optical phenomena, climate, world weather and climatic influences, weather and health, culture, agriculture, solar and oceanic influences, and the weather services of the U. S. (including the Air Weather Service and Naval Aerology). (Same item as 8.8-10, Aug. 1957, MAB.) *Subject Headings:* 1. Meteorology textbooks 2. Elementary meteorology.—M.R.

11B-17

551.5(02)

†Blumenstock, David Irving, **The ocean of air**. New Brunswick, New Jersey, Rutgers Univ. Press, 1959. 457 p. figs., charts, notes (incl. bibliographic refs.) p. 417-440. **DLC** (QC863.B55). Review by Robert Brittain in *Saturday Review*, 42(50):34-35, Dec. 12, 1959.—A new and long-awaited approach to instruction in practical meteorology is used in this text which BLUMENSTOCK has been a decade in preparing. It would be useful for general information, or for an introductory course at an agricultural, technical, military or teachers college. The outline is logical, the subjects are introduced with either an historical, literary or philosophical quotation or allusion, the annotations are both scholarly and personalized, and the book is well indexed with respect to subjects, persons and places. Material throughout is up-to-date and valid through early 1959. The 3 major parts cover: Pt. I, Physical nature of atmosphere; Pt. II, Observation, prediction and control; and Pt. III, Application. In Pt. I the usual elements: radiation, thermal patterns, winds in general, special winds, hydrologic cycle, deserts and moist regions, water management and the upper atmosphere—are covered in short, readable chapters. In Pt. II the modern methods of observation and of forecasting, climatic changes, and weather modification are treated in some detail. In Pt. III relations of atmosphere, weather and climate to human health and disease, to agriculture, industry, commerce, war, nuclear weapons and, finally, weather in history are treated on the basis of the author's extensive and varied experiences in all of these fields. No mathematics are included, and the graphical material is almost all original. (Same item as 10.11-4, Nov. 1959, MAB.) *Subject Headings:* 1. Meteorology textbooks 2. Applied meteorology.—M.R.

11B-18

551.510.53:621.396.11(02)

†Boudouris, G., **Propagation troposphérique**. [Tropospheric propagation.] Pref. by E. Vassy. Paris, Centre de Documentation Universitaire, 1957. 463 p. numerous figs., bibliog. p. 459-463, eqs. Mimeo. **DLC** (QC661.B63)—The author presents in this work a synthesis of present knowledge concerning the propagation of radioelectric waves. The work is composed of 7 parts which deal successively with: 1. Propagation of plane waves; 2. Theorems and general notions. Specific waves; 3. and 4. Propagation over a level continent; 5. Propagation over the spherical earth; 6. Propagation over a nonhomogeneous world. Influence of irregularities of the ground and obstacles; 7. Propagation in real troposphere (nonhomogeneous). (Same item as 10.5-28, May 1959, MAB.) *Subject Heading:* 1. Tropospheric radio wave propagation textbooks.—A.V.

11B-19

551.507.362.1:551.510.53

*†Boyd, R. L. F.; Seaton, M. J. (both, Univ. College, London) and Massey, Harrie, S. W. (eds.), **Rocket exploration of the upper atmosphere**. Special supplement to the *Journal of Atmospheric and Terrestrial Physics*, Vol. 1. London, Pergamon, 1954. 376 p. numerous figs. (incl. photos), tables, refs., and eqs. On t-p: Papers included in this volume were read at a conference arranged by the Upper Atmosphere Rocket Research Panel of the United States and by the Gassiot Committee

of the Royal Society of London. **DLC** (QC879.B68), **DWB**—About 50 articles on various aspects of rockets, rocket research and knowledge of high atmosphere physics gained from rocket flights presented at the Oxford Conference on Aug. 24–26, 1953, are published in this nicely bound book. The papers are grouped under: I. Rocket techniques; II. Pressures, temperatures and winds; III. Composition of high atmosphere; IV. Ionosphere, solar radiation, geomagnetic variations; V. Rocket cosmic ray measurements; VI. Laboratory studies and VII. Theory and future research (Each article abstracted separately. Contents are listed in Pt. III, p. 707, May 1955, *MAB.*) (*Same item as 6.5–9, May 1955, MAB.*) *Subject Headings:* 1. Rocket research 2. Upper atmosphere physics 3. Upper air data. I. Royal Society of London. Gassiot Committee II. Upper Atmosphere Rocket Research Panel (U. S.).—*M.R.*

11B-20

551.574.1:551.594.2(02)

†Bricard, Jean, *Physique des nuages*. [Cloud physics.] Paris, Presses Universitaires de France, 1953. 343 p. 89 figs., 8 plates (photos), bibliog. p. 329–332. (*"Euclide" Series.*) **DLC** (QC921.B7)—A complete, detailed and systematic treatment of many aspects of cloud physics, from the modern point of view. The chapters comprise: 1) Classification and methods of observation; 2) Properties of air masses (stability and instability); 3) Formation of clouds in homogeneous air masses; 4) Orographic and frontal clouds; 5) Clouds of water droplets, supercooled clouds; 6) Ice crystal clouds; 7) Precipitation formation; 8) Diffusion of light by clouds; 9) Transmission of radiation by clouds; 10) Electric field of clouds; 11) Clouds and electric currents in atmosphere; 12) Origin of electricity in clouds; 13) and 14) Lightning structure, spectra and photography; 15) Lightning mechanism. The book is full of illustrative schematic diagrams and theory (clearly presented), and reviews most of the recent work in this field—especially in the field of atmospheric electricity connected with clouds and thunderstorms. (*Same item as 6.2–1, Feb. 1955 and 6F-233, June 1955, MAB.*) *Subject Headings:* 1. Cloud physics textbooks 2. Thunderstorm electricity.—*M.R.*

11B-21

551.583(02)

*†Brooks, C. E. P., *Climate through the ages: a study of the climatic factors and their variations*. 2d ed. completely rev. N. Y., McGraw-Hill, 1949. 395 p. 39 figs., 31 tables, refs. at end of each ch. **DLC** (QC884.B65 1949). Transl. into Russian with title *Klimaty proshlogo*, issued Moscow, 1952. Transl. by V. G. Levinson. Ed. by B. P. Alisov and V. I. Gromov. 356 p. 39 figs., 29 tables, refs. **DLC** (QC884.B6516)—The first ed. published in 1926 (*see 10A-2, Jan. 1959, MAB*) reviewed the latest theories on climatic changes and expressed the conclusions of the author after 20 years of intensive study in this field. During the two subsequent decades much additional evidence for or against these theories accumulated allowing a revision which expressed a more mature judgment in this rapidly changing field of research. Critical examination of much of the data taken from literature and chronicles led to their being rejected and deleted from this edition. The book is arranged in the same general order as the first ed.: Pt. I discusses the climatic elements and their variation, pressure and winds, oceanic circulation, solar radiation, cloudiness, continentality, temp., precip., effect of glaciers or lack of glaciers on climate; effect of mountain building, and astronomical factors on glaciation and deglaciation. Pt. II reviews geological climates and their causes, including the theory of continental drift. Pt. III takes up the more plausible evidence of climatic fluctuations in the historical past, with citations from recent literature on the subject, and treated from the evidence for each continent: Europe, Asia, Africa, America and Greenland. The appendix contains a selective bibliography on various theories of climatic change such as: 1) Cosmical changes, 2) solar radiation, 3) astronomical theories, 4) geothermal, 5) polar movement or crustal drift, 6) elevation 7) land-sea distribution, 8) ocean currents, 9) changes in atmospheric composition, 10) volcanic dust and 11) changes in atmospheric circulation. The statistical value of tree ring, pollen, varve and other methods of geochronology, and the significance of changes in Arctic ice are brought into perspective. (*See 3-121, March 1950; 10A-8 (Eng.); 10A-11 (Russian).*) *Subject Headings:* 1. Climatic variations 2. Paleoclimatology 3. Historical climates 4. Climatic change theories. I. Levinson, V. G. (transl.) II. Alisov, B. P. (ed.) III. Gromov, V. I. (ed.).—*M.R.*

11B-22

551.58(02)

*†Brooks, C. E. P., *Climate in everyday life*. London, Ernest Benn, 1950. 314 p. 34 figs., 26 tables, 3 append. (tables), 155 refs. **DWB**—A book planned to provide the practical information most often required about climate. Pt. I, *Living with the climate*, discusses the various types of climate and their effect on human efficiency, comfort and health. World charts are given for mean air and wet bulb temperatures, Jan. and July. Subjects discussed include water-, wind- and sun-power, water supply, and transport, including hindrance by snow cover and sea ice. Ch. 2 discusses siting and design of houses and factories in relation to climate (with table of sunshine at 107 places), lighting, purity of air, local climates, and wind structure. In Ch. 3–7 the peculiarities of different climates are set out from the human point of view. Pt. II, *Climate as an enemy*, discusses climate and the deterioration of materials, including extreme temperatures in the sun and effect of tem-

perature and humidity on corrosion and moulding; atmospheric pollution; and climatic "accidents"—heavy rain, floods, hail, snow, ice storms, lightning, tornadoes, squalls, hurricanes and typhoons. Pt. III, **Control of climate**, includes heating, air conditioning, lighting, clothing, rain making and fog dispersal, prevention of hail, protection from lightning, frost prevention and windbreaks. Appendix I gives climatic statistics and "thumb-nail" sketches for over 270 places in all parts of the world. (*Same item as 2.1-149, Jan. 1951, MAB.*) *Subject Headings:* 1. Climatology 2. Architecture 3. Industrial climatology.

11B-23

551.5:519.2(02)

Brooks, C. E. P. and Carruthers, N., **Handbook of statistical methods in meteorology**. London, H.M. Stationary Office, 1953. 413 p. 75 figs., tables, refs., eqs. At head of title: *MO 538. DWB, DLC (QA276.B73)*—This book sets out formulas, methods and examples of the application of modern statistical ideas to meteorological data. Pt. I, The distribution of observations, deals with "observations" as individual phenomena, their nature and errors, probability, one-dimensional frequency distributions, mean values, standard deviation, skewness, kurtosis, and significance tests. The properties of various types of distribution—binomial, normal, Pearson curves, etc.—are summarized. A chapter is included on the analysis of variance. Pt. II, Related variables, discusses space distributions, vector quantities, correlation, smoothing, interpolation and curve fitting. Pt. III, Time series, includes persistence, harmonic analysis, and examination of various methods of periodogram analysis. Appendices give useful statistical formulas and tables. Nearly all the examples and exercises are taken from meteorology. (*Same item as 4.6-2, 10A-12 and 11A-12, MAB.*) *Subject Headings:* 1. Statistical analysis handbooks. I. Great Britain. Meteorological Office.—*C.E.P.B.*

11B-24

551.46(02)

*†Bruns, Erich (*Geophysical Inst., Leipzig Univ.*), **Ozeanologie, Bd. 1, Einführung in die Ozeanologie; Ozeanographie**. [Oceanology, Vol. 1, Introduction to oceanology; oceanography.] Berlin, Deutscher Verlag der Wissenschaften, 1958. 420 p. 145 figs., 85 tables, 172 refs. Geographic, personal name, subject, illustration and table indexes. *DWB (551.46 B899oz), DLC (GC11.B77)*. Review by Gerhard Neumann in *American Meteorological Society, Bulletin*, 40(11):580, Nov. 1959. Review by G. Neumann in *Geographical Review*, 50(2):305-306, April, 1960.—A competent textbook on the technical aspects of oceanography (as a branch of oceanology) consisting of hydrological and hydrographic methods and results as pertaining to oceans and their borders. This volume, the first in a 4 volume "handbook" (the second volume will deal with oceanometry or measurements and equipment for measuring parameters pertinent to oceanography, and the 3rd and 4th with oceanology per se or as a science), gives a theoretical and empirical description of the oceans, and various methods of forecasting various parameters and their application to other fields. The first 5 chapters comprise an introduction to oceanology (hydrology, hydrometry, relation of oceanology to hydrology and geophysics, oceanometry and development of expeditionary investigations of the oceans). The next 2 chapters (6 and 7) deal with measurement of bottom relief in oceans and seas, and in specific areas. Ch. 8-13 cover fundamentals and methods of organizing and conducting oceanographic work (ships and navigation, sea charts, nautical handbooks and directions or guides, navigation methods, sea surface surveying, bottom surveying in deep and shallow water); Ch. 14-22 deal with hydrological characteristics of oceans and seas (Atlantic Ocean, Atlantic bordering seas, Pacific, Pacific bordering seas, Indian Ocean, Indian seas, Arctic Ocean, Arctic seas and, finally, the great seas of Eurasia). For each of the oceans or seas, the bottom relief, geological character, currents, tides, waves, temperature, salinity, density, transparency, color, ice and hydrochemistry are discussed wherever data are available. Extensive author, geographical and subject indexes, a good bibliography, a list of figures and tables, and a systematic outline of contents are appended. Many small charts are included in the text as well as a number of folded charts in pocket at end of volume, and considerable exemplary data, tables useful in calculations, a table giving data on 305 oceanographic expeditions from 1734 to 1955 (76 Russian, 60 British, 45 U. S., 37 German, 20 French, 17 Norwegian and <10 from each of 13 other countries), plus many schematic drawings, photos of equipment, etc. (*Same item as 10.10-13, Oct. 1959, MAB.*) *Subject Headings:* 1. Oceanography textbooks 2. Hydrography textbooks 3. Oceanographic expeditions.—*M.R.*

11B-25

551.511.33:016(02)

†Budyko, M. I., **Теплової баланс земної поверхності**. [Heat balance of the earth's surface.] Leningrad, Gidrometeoizdat, 1956. 254 p. 72 figs., 19 tables, 344 refs., 150 eqs. *DWB, DLC (QC907.B8)*. Transl. into English by Nina Stepanova Zikeev, issued Wash., D. C., U. S. Weather Bureau, 1958. 259 p. 73 figs., 19 tables, etc. Price: \$4.00 from Office of Technical Services, Wash., D. C., 25. Review of English transl. by H. E. Landsberg in *American Meteorological Society, Bulletin*, 39(12):660-661, Dec. 1958.—The basic knowledge of the heat balance between the earth and the atmosphere, as gained from over 340 articles and monographs cited in the bibliography (31

by the author himself during period 1946-1955), and not neglecting western sources (94 refs. cited from western and 250 from Russian authors), is summarized systematically. The 6 chapters (16 paragraphs) deal with I. Introduction, 1) equations of the heat balance, 2) general review of research on heat balance; II. Calculations, 3) radiation balance, 4) turbulent exchange between soil, ice on sea and atmosphere, 5) evaporative heat loss, 6) accuracy of determinations; III. Geographical distribution of, 7) radiation balance, 8) heat balance, 9) annual and diurnal regime; IV. Heat balance and energy, considerations involved in physico-geographic processes, 10) relation between heat and water balance, 11) heat balance and geographic zones, 12) and plant cover; V. Heat balance and meteorological amelioration measures, 13) shelter belts and forests, 14) irrigation; VI. Heat and water balance of the earth, 15) heat balance, 16) water balance and hydrologic cycle. The basic equations are included but on the whole the treatment is empirical (descriptive or graphical) rather than theoretical. The excellent *Atlas teplovogo balanssa* (see 8.5-19 and 11A-25, *MAB*) edited by the author and published by the Glav. Geofiz. Observ. of which the author is director, is a companion piece (or vice versa) to this handy monograph. Applications to agriculture, engineering, hydrology, oceanography are obvious. The book is intended for students or specialists in meteorology, climatology, hydrology and oceanography and for other scientists, technicians, or students wishing to learn more about this fundamental subject, either from a continental or global perspective, or from the micrometeorological point of view. (*Same item as 8.5-20, May 1957, MAB.*) *Subject Headings:* 1. Heat balance of the earth's surface 2. Energy exchange sea-atmosphere 3. Energy exchanges earth-atmosphere 4. Heat balance textbooks 5. Heat balance bibliographies. I. Zikeev, Nina (S.), (*transl.*).—M.R.

11B-26

551.589:551.509.31 (02)

§†*Bugayev, V. A.; Dzhordzhio, V. A.; Kozik, E. M. et al., *Sinopticheskie protsessy Srednei Azii*. [*Synoptic processes in Central Asia*.] Tashkent, Izdatel'stvo Akademii Nauk Uzbekskoi SSR, 1957. 477 p. 170 figs., 161 tables, 296 refs. Added title page in Uzbek. At head of t-p.: Akademiia Nauk Uzbekskoi SSR, Institut Matematiki i Mekhaniki. DWB. Also: Akademiia Nauk Uzbekskoi SSR. Institut Matematiki i Mekhaniki, *Atlas tipichnykh sinopticheskikh protsessov nad Srednei Aziei*. [Atlas of typical synoptic processes over Central Asia.] Tashkent, 1954. 1 p. text. 116 charts (in color) 42×31 cm. Looseleaf. DWB—This substantial volume, together with the atlas of synoptic types of Central Asia, constitutes one of the best synoptic climatology or forecasting manuals ever published. It could be used for advanced courses in synoptic meteorology or for practicing forecasters. The 15 chapters written by the various authors cover the following subjects: 1) History and development of synoptic studies for Central Asia; 2) South Caspian cyclones; 3) Murgavskii cyclones; 4) Upper Amudarya cyclones; 5) Warm air invasions; 6) N.W. cold air invasions; 7) Northerly cold air invasions; 8) Wave development in S. and S.E. Central Asia; 9) Slow-moving cyclones in N. Central Asia; 10) S.W. peripheral anticyclones over Central Asia; 11) Westerly intrusions; 12) Summer thermal lows; 13) Synoptic conditions for severe and unfavorable weather in Central Asia; 14) Climatic characteristics of cyclones and anticyclones in Central Asia; 15) Circulation factors influencing the climate of Central Asia. The charts in the *Atlas* corresponding to the "types" as represented by Ch. 2-13 are indicated in the introduction. The bibliography contains a list of nearly 300 references to synoptic studies of the region, scores of which were published between 1933 and 1956 in local or national journals by V. A. BUGAEV (59 refs.), V. I. GUBIN (13 refs.), V. A. DZHORDZHIO (52 refs.), M. A. PETROSIANTS (9 refs.), N. N. ROMANOV (12 refs.), T. A. SARYMSAKOV (13 refs.), I. M. IAROSLAVTSEV (14 refs.) and others. Not only are there dozens of synoptic illustrations (charts, maps and schematic diagrams) but over 160 tables of analytical synoptic aerological or climatic data representing the several synoptic types. Practical rules for forecasters are included in each chapter, and the balance between the theoretically and the empirically derived formulas or aids is maintained throughout the work. The *Atlas* presents a well analyzed series of colored surface (03 and 15 h) and 700 mb (+thickness 500/1000 mb) synoptic charts chosen from example corresponding to the types indicated in Ch. 2-13 of the manual, and are the years 1944-51. Some of the charts cover all of Europe and Central Asia, whereas others are on a larger scale and cover only the area from the Volga to the western ranges of Sinkiang. (*Same item as 9.5-12.*) *Subject Headings:* 1. Synoptic forecasting textbooks 2. Synoptic climatology 3. Forecasting manuals. I. Petrosiants, M. A. II. Pshenichnyi, A. Ia III. Romanov, N. N. IV. Chernysheva, O. N. V. Sarymsakov, T. A.—M.R.

11B-27

551.5 (02)

Byers, Horace Robert (*Chicago Univ.*), *General meteorology*. 3d ed. N. Y., McGraw-Hill, 1959. 540 p. numerous figs., foot-refs., eqs. DLC (QC861.B9). Review in *Royal Meteorological Society, Quarterly Journal*, 86(367):123, Jan. 1960. Review in *World Meteorological Organization, WMO Bulletin*, 8(4):222, Oct. 1959. Review by A. Vandenplas in *Ciel et Terre*, 76(1/2):63, Jan./Feb. 1960. First ed. published 1937 with title, *Synoptic and aeronautical meteorology*. Second ed. with title, *General meteorology*, pub. 1944 (for abstracts on this latter ed., see D-49, 4B-330, 5H-23,

MAB).—Although this edition of BYERS' universally known text for mature students of meteorology is no larger than the 1944 edition, all except the first two chapters have been completely rewritten and many new illustrations added to incorporate the vast body of new or more refined knowledge that has accrued since World War II. Although avoiding or even eliminating material on applied meteorology in order to stick to fundamentals, the author has maintained a nice balance between photographic, schematic, synoptic and theoretical (mathematical) presentation. The 21 highly condensed and well-illustrated chapters cover: 1) sun and earth; 2) radiation; 3) heat balance; 4) temperature distribution in atmosphere; 5) surface instruments and observations; 6) upper air observations; 7) thermodynamics and statics; 8) water vapor and thermodynamics; 9) winds; 10) vorticity and fluid flow; 11) general circulation; 12) cyclone and anticyclone structure; 13) life cycle of cyclones; 14) air masses; 15) synoptic analysis; 16) tropical meteorology; 17) objective and numerical forecasting; 18) cloud physics; 19) thunderstorms and squalls; 20) fog; and 21) turbulence. This is a handy and inexpensive textbook which everyone should have on his desk for reference. (*Same item as 10.9-6 and 11A-20, MAB.*) *Subject Heading: 1. Meteorology textbooks.*—M.R.

11B-28

551.511:551.509.3(02)

Čadež, M., **Fizika atmosfere, Pt. 1.** [Physics of the atmosphere, Pt. 1.] Belgrade. Hidrometeorološka Služba, 1952. 200 p. 179 figs., eqs. In Croatian. **DWB, DLC** (QC880.C3)—A didactic treatment of the various aspects of physical and dynamic meteorology that have to do with atmospheric composition, structure, thermodynamics, condensation, evaporation, wind turbulence, adiabatic processes, convergence, divergence, vorticity, etc. The purpose of the work is to provide the student with enough theoretical background to understand the operations in synoptic analysis and forecasting. The text is liberally provided with original schematic diagrams and illustrative meteorological charts in addition to the standard mathematical developments found in modern textbooks on dynamic meteorology. (*Same item as 4.11-6, Nov. 1953, MAB.*) *Subject Headings: 1. Dynamic meteorology textbooks 2. Synoptic meteorology 3. Croatian language.*—M.R.

11B-29

551.510.4(02)

†Cadle, R. D. (*Stanford Res. Inst., Stanford, Calif.*), **Particle size determination.** New York, Interscience Publishers, Inc., 1955. 303 p. numerous figs. (incl. photos), tables, refs. at end of each chapter, numerous eqs. **DLC** (TA406.7.C3), **DWB**—The many methods of particle sampling and analysis in use through 1954 are treated systematically in this handbook. Optical microscopy, electrical microscopy, sieve analysis, sedimentation elutriation, surface area measurements, optical methods (coronas, scattering, polarization, etc.), X-ray measurements, sonic electrostatic and diffusion methods, etc. are discussed. Treatment of data is also considered. Applications to meteorology are so numerous it is possible to mention only a few: atmospheric optics, turbidity, cloud physics, visibility, atmospheric pollution, dust, sand and fallout. However, such applications are only stressed to show that the method of sampling or analysis depends on the particle size range, form of results, accuracy required, or application. The theory is not neglected and the equipment used with each method is amply illustrated. (*Same item as 8.5-27, May 1957, MAB.*) *Subject Headings: 1. Particle size determination 2. Aerosol sampling and analysis 3. Handbooks.*—M.R.

11B-30

551.594(02)

†Chalmers, John Alan, **Atmospheric electricity.** London, Pergamon Press, 1957. 327 p. 64 figs. (incl. photos), bibliog. p. 287-318, eqs. **DLC** (QC961.C46 1957)—The present edition is just double the size of the author's 1949 book by the same title and is almost completely rewritten because of the rich supply of new research (since World War II) reported in the voluminous literature cited (over 600 refs.). All of the aspects of atmospheric electricity are treated systematically, except for the special fields of aurora, ionospheric propagation, and earth currents. The several chapters cover: 1) History; 2) General principles; 3) Atmospheric ions; 4) Vertical potential gradient; 5) Conductivity of air; 6) Air-earth currents; 7) Point-discharge currents; 8) Precipitation currents; 9) Transfer of charge; 10) Thunderstorm electricity; 11) Lightning discharges; and 12) Charge separation. Literature through 1956 is cited. An excellent subject index is appended. (For abstract on earlier work of same title, see 6-103, June 1950, *MAB.*) (*Same item as 9.1-6, Jan. 1958, MAB.*) *Subject Heading: 1. Atmospheric electricity textbooks.*—M.R.

11B-31

551.521(02)

†Chandrasekhar, Subrahmanyan, **Radiative transfer.** Oxford, Clarendon Press, 1950. 393 p. figs., refs., eqs. Price: \$8.50. **DLC** (QB461.C46), **DWB.** Transl. into Russian with title **Perenos luchistoi energii.** Ed. by E. S. Kuznetsova. Pub. Moscow, Izdatvo Inostrannoi Literatury, 1953. 431 p. figs., bibliog. at end of each ch., eqs. **DLC** (QB461.C467)—A textbook which covers thoroughly and in great detail the modern theories of radiative transfer, scattering, polarization,

emission, absorption, diffuse reflection, Rayleigh scattering and scattering by planetary atmospheres; radiative equilibrium of a stellar atmosphere and other problems of astrophysics and radiation in an atmosphere with varying geometrical, physical and chemical properties. After each chapter there is an extensive list of annotated references on pertinent literature. The vast amount of theory which is carefully developed, and the concrete application cited make this unique work invaluable to the meteorologist working in radiation or optics. (*Same item as 4.9-2, Sept. 1953, MAB.*) *Subject Headings: 1. Radiative transfer textbooks 2. Planetary atmospheres 3. Scattering. I. Kuznetsova E. S. (ed.).—M.R.*

11B-32

551.583.3:016

Charlesworth, John Kaye (*Queens Univ., Belfast*), **The Quaternary era with special reference to its glaciation**. London, Edward Arnold, 1957. 2 vol. (1700 p.), 326 figs., tables, bibliog. at end of each chapter. Quaternary era bibliog., p. 1556-1601 (1924 titles). **DLC** (QE696.C53 1957)—These monumental volumes represent a systematic survey of the pertinent facts or data contained in nearly 2000 articles from hundreds of sources. Among the 50-odd chapters are a number on purely meteorological or climatological aspects of the Quaternary period, including recent climatic changes and glacial advances or retreats. Other chapters discuss snow, ice, permafrost, sea level, volcanism, glaciation of the British Isles and of various localities, glacial lakes, geochronology of Quaternary; stratigraphy, plant, animal and human life, etc. Specifically, Ch. 1) discusses snow, snowline and avalanches; 2) glacier structure, névé, firn; 3) ablation; 4) classification of glaciers; 5) ice motion and temperature; 6) meteorological periodicities, sunspots, glacier oscillations and their cause; 7) shelf ice; 8) drift ice; 9-15) erosion by glaciers; 16-25) deposition; 26) loess; 27) cryoturbation; 28) sea ice action; 29-31) pleistocene meteorology and climatology; 32) world glaciation; 40) Periglacial conditions; 41) pluvial belts; 49) postglacial climatic changes; 50) chronology; and 51) causes of glacial period. The formidable bibliography, detailed index and hundreds of reference citations at the end of each chapter make this an outstanding contribution to the bibliography of the subject. (*Same item as 9.1-11 and 11A-40, MAB.*) *Subject Headings: 1. Quaternary glaciation 2. Climatic changes 3. Glacial climates 4. Pleistocene climatology 5. Bibliography on glacial climates.—M.R.*

11B-33

551.579 (02)

*Chebotarev, A. I., **Gidrologiia sushii**. [Land hydrology.] Ed. by V. I. Uryvaev. Leningrad, Gidrometizdat, 1955. 396 p. 137 figs., photos, 61 tables, 16 refs., 105 eqs. **DWB** (M79 C514gi)—Review by V. M. Pavlov in *Meteorologiya i Gidrologiya*, Leningrad, No. 6:67, June 1956. Trans. into English of the Review, available for reference. **DWB** (627 P3384bo)—This edition of the standard text on hydrology of continental waters and land consists of 56 chapters divided among 8 major headings: 1) basic concepts and history, 2) the hydrologic cycle, 3) underground waters, 4) lakes, 5) bogs, 6) glaciers, firn, etc., 7) rivers and 8) river runoff and flood calculations and forests. It is based on the latest Russian concepts and research in hydrology and hydrometeorology and is intended for students and practicing workers in these fields. The text is full of data, charts, nomograms and other illustrative material of a practical nature. (*Same item as 9.5-7, May 1958, MAB.*) *Subject Headings: 1. Hydrology textbooks 2. Hydrometeorological forecasting 3. Bogs 4. Lakes 5. Glaciers.—M.R.*

11B-34

551.58:519.24 (02)

*†Conrad, Victor and Pollak, Leo Wenzel, **Methods in climatology, including some methods in general geophysics**. 2nd ed., rev. and enl. Cambridge, Harvard University Press, 1950. 459 p. 115 figs., 99+tables, refs., numerous eqs. **DWB, DLC** (QC981.C714 1950)—The aim of this work, as was the case with the first edition (1944), is to help the student or research worker in climatology or geophysics to solve types or groups of problems rather than individual problems. Most of the chapters in Pt. I (Methods in climatology) were revised and enlarged. They cover such problems as: (1) peculiarities in observational material and methods; (2) statistical analysis of climatic elements; (3) aids to computation, such as nomograms and tables; (4) curve fitting and smoothing; (5) harmonic analysis; (6) application of methods to temperature and pressure data; (7) to wind, humidity, cloudiness and precipitation data; (8) homogeneity and correlation, reduction to a standard period; (9) isoline charts, anomalies, profiles, wind roses and indices and (10) climatography, including dynamic climatology. Pt. II is entirely new material, including a chapter on mechanical methods of computation (slide rules, calculating machines, punched card machines and their application), and three chapters on periodography: (1) hidden periodicities, (2) tests of significance and (3) autocorrelation. A useful set of tables giving in detail the values of various functions is contained in the appendix. The text is amply illustrated and annotated, and contains material of value to both the elementary and the most advanced student. (*Same item as 2.1-150, Jan. 1951, MAB.*) *Subject Headings: 1. Climatology textbooks 2. Statistical methods in climatology.—M.R.*

11B-35

551.556.4:551.510.42(02) 551.574.1(02)

*†DallaValle, Joseph Marius, **Micromeritics: the technology of fine particles**. 2d ed. New York, Pitman, [1948]. 555 p. 131 figs., 88 tables, eqs., append., bibliog. p. 496-538. Price: \$8.50. **DWB**—A technical text for engineering students covering all aspects of the science of the physics of small particles, and application of this knowledge to soil physics, hydrology, industrial operations, etc. Methods of measuring particles, units, the behavior of particles in fluids, equations of motion of various types; size, shape and size distribution; settling, packing, sieving, calibration of instruments; behavior of particles under pressure; diffusion (thermal, turbulent, and point source); electrical, optical and acoustical aspects; thermodynamics of small particles (heat transfer); surface properties (absorption, condensation, evaporation, hygroscopicity); chemical properties; transport by water and wind (sand dunes, atmospheric dust and its sampling, pollution and its control). This second edition contains a great deal of material not included in the first (1943) edition. For instance, the chapter on particle dispersion by eddy diffusion is much more comprehensive and leads to new treatment of the physics of smoke, dust and sand movement. Most of the chapters have been revised, expanded or rewritten. The bibliography is most extensive, comprising over 600 entries (43 pages). A major portion of the work is devoted to theoretical treatment, although each such treatment leads to definite applications. (*Same item as 4.9-4, Sept. 1953, MAB.*) *Subject Headings:* 1. Micromeritics textbooks 2. Small particles 3. Dispersion of particles 4. Sand 5. Dust.—*M.R.*

11B-36

551.5:629.13(02)

Dannevig, Petter, **Meteorologi for flygere**. [Meteorology for fliers.] Oslo, H. Aschehoug, 1954. 224 p. 86 figs., 9 plates (fold.), 8 tables. **DLC** (TL556.D3)—This is a well arranged textbook of descriptive meteorology containing numerous diagrams, charts and photographs, especially designed for fliers. The characteristics of the individual meteorological variables, the methods and apparatus used in studying them and their spatial and temporal variations, the general circulation, weather forecasting, etc., are discussed. Special aspects of meteorology of interest to aviation such as pressure flying, special winds, flying in warm and cold air, weather operations for fliers, etc., are taken up. (*Same item as 8.8-12, Aug. 1957, MAB.*) *Subject Headings:* 1. Aviation meteorology 2. Meteorology textbooks.—*I.L.D.*

11B-37

551.511:551.513:551.509.312(02)

†Defant, Albert and Defant, Friedrich (*both, Innsbruck Univ.*), **Physikalische Dynamik der Atmosphäre**. [Physical dynamics of the atmosphere.] Frankfurt a.M., Akademische Verlagsgesellschaft M.B.H., 1958. 527 p. 139 figs., 28 tables, numerous eqs., bibliog. at end of each ch. **DLC** (QC880.D42). Review in *Royal Meteorological Society, Quarterly Journal*, 84(362):478, Oct. 1958.—This excellently printed textbook on dynamic meteorology gives the basic theory and facts concerning: I. Atmospheric statics; II. Thermodynamics of dry and moist air; III. Changes of state in vertical air columns, stability and instability; IV. Radiation and heat balance; V. Kinematics; VI. Equations of motion on a rotating earth; VII. Simple horizontal motions; VIII. Circulation and vorticity; IX. Discontinuity surfaces; X. Turbulence and Austausch; XI. Friction and turbulence in atmosphere; XII. Energetics; XIII. General circulation (over 170 p.); XIV. Numerical prediction and XV. Atmospheric tides. Each chapter is systematically subdivided into discrete sub-chapters, and contains a good list of classical references to the best literature on each subject up to 1951 (in the chapters on general circulation, numerical prediction and radiation there are a few references as recent as 1955, 1956, or 1957). Although the approach is obviously classical, the very extensive treatment of the polar, mid-latitude and tropical circulation gives in lucid form the principles of cyclo- and anticyclogenesis, zonal circulation, stratospheric circulation, jet stream, with good synoptic illustrations, zonal and meridional cross sections and models taken from work of PALMÉN, RIEHL, J. BJERKNES and ROSSBY dealing with Northern Hemisphere or North America. Its chapter on numerical prediction takes up and illustrates the theories and methods of CHARNEY, FJØRTOFT, KIBEL', EXNER, N. PHILLIPS and EADY including the advective, barotropic two-layer, $2\frac{1}{2}$ dimensional and graphical integration techniques or models. (*Same item as 10.5-8, May 1959, MAB.*) *Subject Headings:* 1. Dynamic meteorology textbooks 2. General circulation 3. Numerical forecasting.—*M.R.*

11B-38

551.586:616

†de Rudder, Bernhard (*Dir. Univ. Kinderklinik, Frankfurt a.M.*), **Grundriss einer Meteorobiologie des Menschen: Wetter- und Jahreszeiteinflüsse**. [Outline of meteorobiology of man: weather and seasonal influences.] Berlin, Springer, 1952. 3d ed. 303 p. 56 figs., 30 tables, bibliog. p. 268-296. **DWB**—A systematic treatise on the physiological and pathological influences exerted on human being by weather processes and seasons. The methodology underlying the scientific study of meteorological phenomena in man is discussed; a brief account of air masses, cyclonic processes in the atmosphere, occlusion processes, föhn and inversions is given; and the application of simple statistical techniques for testing correlation significance and degree of ran-

domness is illustrated. The rest of the book comprises: 1) a detailed survey of the literature on the reactions to weather as revealed by such diseases as eclampsia, circulatory and heart diseases, croup, etc.; the physiological effects of cyclones, inversions, föhn winds, of ozone and atmospheric electricity; 2) the relationship between season and the manifestation and frequency of diseases and 3) meteorological prophylaxis. (*Same item as 4.8-7, Aug. 1953, MAB.*) *Subject Headings:* 1. **Biometeorology** 2. **Medical meteorology**.—*I.L.D.*

11B-39

551.58:523.4(02)

†de Vaucouleurs, Gérard, **Physique de la planète mars: introduction à l'aréophysique**. [Physics of Mars: introduction to aerophysics.] Paris, Albin Michel, 1951. 420 p. 50 figs., 29 tables, 78 refs., eqs. **GB-MO**—This book gives a surprising amount of information. The Martian atmosphere includes 3 cloud layers: 1) bluish-white clouds at 10-30 km (probably droplets or crystals of CO₂ due to intense afternoon convection); 2) a violet layer at 10-15 km (finely divided matter of unknown origin) and 3) a yellow layer at 3-5 km, probably dust. Wind circulation is deduced from cloud drift; a chart for northern winter, with fronts and isobars, rather resembles earth in January. Atmospheric pressure at ground 87 ± 8 mb, variation with height z (km) given by $\log P_z = 1.94 - 0.025z$. S. L. HESS finds a tropopause (about -160°C) at 40-50 km. At very high levels there may be an ionosphere and auroras. Air composition: N₂, 98.5%; Argon, 1.2%; CO₂, 0.25%; O₂, probably under 0.1%; O₃ still less. "Martian climatology" gives calculated distribution of radiation, and surface and air temperatures derived by various methods. Soil temperature averages -23°C for whole disc, -10° at equator to -60° at poles, annual range 120° at South Pole, 30° in tropics; diurnal range in tropics 50°C . Dark regions hottest. Air temperature near ground 30° lower than ground. Pt. 3 deals with polar caps of ice, snow and rime only a few cm thick. A dark fringe in spring is probably liquid water. Deserts are intensely dry; dark areas have more water vapor, but no chlorophyll plants. (*Same item as 4.4-4, April 1953, MAB.*) *Subject Headings:* 1. **Planetary climate textbooks** 2. **Martian climate**. **I. Hess, S. L.**—*C.E.P.B.*

11B-40

551.584:551.510.522:551.501.7:551.508.82

†Deviatova, Valentina Aleksandrovna, **Mikroaerologicheskie issledovaniia nizhnego kilometrovogo sloia atmosfery**. [Microaerological research of the lower kilometer of the atmosphere.] Leningrad, Gidrometeoizdat, 1957. 143 p. 49 figs., 24 tables + 14 tables in Appendix, 44 refs., eqs. **DLC** (QC880.D48), **DWB**—A monograph covering several aspects of the micrometeorology of the lower 1000 m of the atmosphere: diurnal variations in temp., wind speed and humidity during the various seasons; and turbulence, lapse rates, etc., based on data from 50 series of soundings (562 actual ascents) to 500-1000 m during 1950-54 at the Central Aerological Observatory. Every month of the year is represented by 1-7 series of soundings, each series comprising an ascent every 3 hrs or in some cases every hour. An AM-Ts AO meteorograph was used in an MAZ (Morskoi aerostat zagrazhdeniia) aerostat. The 5 chapters of the monograph cover: 1) present status of knowledge of the lower kilometer of the atmosphere, temp., lapse rate (inversions), humidity (and humidity gradient), wind (and wind profiles); 2) methods of research with aerostat, characteristics of the aerostat meteorograph, influence of solar radiation on the bimetallic temp. elements, calibration, comparison of results from radiosonde, airplane and aerostat meteorographs, etc.; 3) temperature regime—diurnal, seasonal and vertical gradient variations, inversions, (p. 65-86) and their spectral, temporal and synoptic characteristics; 4) humidity regime—diurnal variations, vertical gradient and variations in various seasons (specific humidity or mixing ratio); 5) wind regime—diurnal cycle, vertical profile, turbulence characteristics related to height, season, temp. gradient and wind. The entire work is well supported by data in the form of analytical tables, graphs, charts, etc. (*Same item as 10.1-14, Jan. 1959, MAB.*) *Subject Headings:* 1. **Microaerological analysis of lowest kilometer** 2. **Inversions over Moscow** 3. **Turbulence regime** 4. **Aerometeorographs** 5. **Aerostat soundings** 6. **Moscow, U.S.S.R.**—*M.R.*

11B-41

551.46(02)

*†Dietrich, Günter and Kalle, Kurt, **Allgemeine Meereskunde: eine Einführung in die Ozeanographie**. [General science of the sea: an introduction to oceanography.] Berlin, Gebrüder Borntraeger, 1957. 492 p. 223 figs., 30 plates, 7 charts (fold. in pocket), 63 tables, bibliog. p. 458-471, eqs. **DWB**, **DLC** (GC11.D5). Review by F. Model in *Deutsche Hydrographische Zeitschrift*, 9(6):299-306, 1956. fig., foot-refs.—An unusually attractive and timely textbook on general physical, chemical, geological and regional oceanography, ranking with the three previous top works in this field (i.e., **SVERDRUP, JOHNSON and FLEMMING, 1942**; **SHULEIKIN, 1953**; and **PROUDMAN, 1953**), but exclusive of the many excellent works on marine meteorology or hydrography. The 10 main chapters are concerned with: 1. Geomorphology of the sea bottom; 2. Physical and chemical properties of sea water; 3. Oceanographic instruments and methods of observation; 4. Heat economy of the oceans; 5. Temperature, salinity, density and ice distribution in seas; 6. Chemistry of oceans; 7. Theory of currents; 8. Surface and internal waves; 9. Long waves and tidal waves; and 10. Regional

oceanography. Excellent reference lists for each chapter are included in the bibliography. (*Same item as 8.6-7, June 1957, MAB.*) *Subject Headings:* 1. Oceanography textbooks 2. Physical oceanography 3. Oceanographic chemistry.—M.R.

11B-42

551.593(02)

*†Dietze, Gerhard (*Gotha*), *Einführung in die Optik der Atmosphäre*. [Introduction to atmospheric optics.] Leipzig, Geest & Portig, 1957. 263 p. numerous figs., tables and eqs., bibliog. p. 253-255. **DLC** (QC975.D5)—This is the most complete text on atmospheric optics since *Meteorologische Optik* by PERNTNER-EXNER, which appeared in 1930. Since then a large number of advances have made it necessary to compile a completely new text. The emphasis is mainly on the geometrical (illustrated by diagrams) rather than the purely mathematical (equations) presentation. The 12 chapters, each with many detailed sub-headings, cover: 1) general; 2) apparent shape of sky and attending phenomena; 3) refraction in a cloudless atmosphere (astronomic, terrestrial, abnormal, mirage, scintillation); 4) halos (reflection, refraction, multiple reflection or refraction, ice crystal phenomena); 5) rainbows (primary, secondary, colors); 6) glories, Bishop's rings, iridescent clouds, Brocken spectra, etc.; 7) extinction, absorption, scattering; 8) sky illumination during daytime and nighttime (albedo, twilight and night sky brightness, moonshine); 9) polarization of skylight; 10) theory of extinction, scattering and polarization of light and applications (Rayleigh and Mie theories); 11) twilight color phenomena (6 phases) and their explanation; 12) visibility (day, night, factors affecting visibility measurement, meteorological and climatological visibility). A bibliography, tables of constants, conversion factors and data of 9 types, source and subject indexes are included. The book is nicely bound and contains good illustrations, some in rich colors. It does not cover aurora, airglow and other luminescent photochemical phenomena. (*Same item as 8.8-13, Aug. 1957, MAB.*) *Subject Headings:* 1. Atmospheric optics textbooks 2. Visibility 3. Refraction of light 4. Twilight phenomena.—M.R.

11B-43

551.58:519.24(02)

*Drozdov, O. A., *Osnovy klimatologicheskoi obrabotki meteorologicheskikh nabludenii*. [Principles of climatological analysis of meteorological observations.] Leningrad, Izdatel'stvo Leningradskogo Universiteta, 1956. 301 p. 53+5 tables, 79 figs., 121 eqs. At head of t-p: Leningradskii Gosudarstvennyi Universitet. **DLC** (QC861.D8)—A systematic text or handbook giving the theory and practical examples of the use of statistical and graphical methods for working up or analyzing meteorological observations for climatological purposes. The 38 parts of the text are divided into 8 chapters: 1) climatology, methodology, and sources of data; 2) structure of meteorological variables; 3) methods of smoothing, analysis of periodicity or rhythm; 4) homogeneity of meteorological time series; 5) accuracy of means, curves of distribution; 6) adjusting a series to a given period (normal), short series extremes; 7) peculiarities of the various meteorological elements with respect to analysis; 8) cartography in climatology. The book treats of the classical methods of compiling the usual surface and upper air elements and does not pretend to go into the latest or most advanced statistical refinements. (*Same item as 9.4-4, April 1958, MAB.*) *Subject Headings:* 1. Statistical methods in climatology 2. Climatology textbooks.—M.R.

11B-44

551.5(02)

†Dubinskii, G. P.; Gural'nik, N. N. and Mamikonova, S. V., *Meteorologiya*. [Meteorology.] Leningrad, Gidrometizdat, 1956. 398 p. 190 figs. (incl. photos), map, 30 tables, 17 refs.—A basic, not-too-technical text on general meteorology for use by technicians in training courses or colleges. Chapters cover: I. General aspects, II. Atmospheric composition and structure, III. Pressure and density, IV. Solar, terrestrial and atmospheric radiation, V. Temperature of soil and water, VI. Air temperature, VII. Moisture, VIII. Condensation, IX. Precipitation, X. Wind and air currents, XI. Optical phenomena, XII. Acoustical phenomena, XIII. Atmospheric electricity. Modern concepts appear in most chapters, e.g., sections on rain making experiments, ionosphere, acoustical sounding of upper atmosphere, visibility, atmospheric, thermal balance of snow cover, etc. (*Same item as 8.9-4, Sept. 1957, MAB.*) *Subject Heading:* 1. Meteorology textbooks.—M.R.

11B-45

551.590.21(02)

†Eigenson, Moris Semenovich, *Ocherki fiziko-geograficheskikh proiavlenii solnechnoi aktivnosti*. [Notes on physico-geographic effects of solar activity.] Lwov, Izdatel'stvo L'vovskogo Universiteta, 1957. 229 p. 40 figs., bibliog. p. 224-229. At head of title page: MVO USSR, L'vovskii Gosudarstvennyi Universitet im. Iv. Franko. **DLC** (QB531.E35)—The basic knowledge and theories regarding the sun and its effect on the general atmospheric and oceanic circulation are treated in Pt. I in a nonmathematical style; and separate chapters in Pt. II cover the 5-6 year, the 11 year, the Brückner, the 100 year (secular) and the many century cycles and their correlation with geophysical phenomena, the effect of sun's longitude and of superposition of cycles. In Pt. III are 9 chapters on Heliogeophysics: effect of solar activity on solar constant, climatic fluctuations, hydrologic phenom-

ena, Caspian Sea level, Arctic ice, Paleoclimates, general circulation in 1954-56, geologic phenomena and on the biosphere, respectively. Only graphic (no tabular) evidence is given to support statements taken from extensive literature on the subject. (*Same item as 10.4-5, April 1959, MAB.*) *Subject Headings: 1. Solar-terrestrial relationships 2. Solar relation textbooks.—M.R.*

11B-46

551.510.534 (02) :01C

†Fabry, Charles, *L'ozone atmosphérique*. [Atmospheric ozone.] Paris, Centre National de la Recherche Scientifique, 1950. 278 p. 75 diagrs., tables, 155 refs., eqs. Biographical note p. 3—**DLC** (QC881.F3)—A comprehensive treatment of all aspects of atmospheric ozone in the light of present theoretical and empirical knowledge. The first chapter deals with progress in this field during the past 200 years. Following chapters take up the concentration of ozone in the atmosphere, absorption of radiation, optical properties, methods of observation, spectroscopy, distribution with temperature of ozone layers in the stratosphere, effect of organisms, theory of dissociation of oxygen, and, finally, the variation of ozone with air masses, geomagnetic storms, etc. An excellent list of references is appended. (*Same items as 3.8-71, 6B-71, 6E-73, and 10E-56, MAB.*) *Subject Headings: 1. Ozone research 2. Ozone bibliographies 3. Ozone textbooks.—M.R.*

11B-47

91 (02) 551.58

Finch, Vernor Clifford; Trewartha, Glenn T.; Robinson, Arthur H. and Hammond, Edwin H. (*all, Univ. of Wisc.*), *Physical elements of geography*. 4th ed. N. Y., McGraw-Hill, 1957. 541 p. figs., photos, tables, refs. **DWB** (551 F842ph), **DLC** (GB55.F52 1957)—The first major section (p. 24-207) of this substantial standard college text on physical geography covers the elements of climate and climatic types. Separate chapters cover: air temp. and sunshine, pressure and winds, humidity and precip., air masses and fronts and disturbances; and tropical humid, dry, humid, mesothermal, humid microthermal and polar climates. Thus almost 40% of the text has to do with climate (for an even fuller treatment by one of the authors, *see 5.9-12, An introduction to climate* by Trewartha). The material on physical geography comprising the present edition has been brought up to date by addition of a number of recent synoptic charts, illustrations, bibliographic references, and textual changes. Climatic data for selected stations in the various "zones" are appended along with color charts of the world showing average annual precip. and modified Köppen climatic regions (*Same item as 10.2-7, Feb. 1959, MAB.*) *Subject Headings: 1. Physical geography textbooks 2. Climatology.—M.R.*

11B-48

551.79 :551.583.3 (02) (7)

†*Flint, Richard Foster (*Yale Univ.*), *Glacial and Pleistocene geology*. N. Y., John Wiley, 1957. 553 p. numerous figs. and tables, 5 plates (fold.), bibliog. p. 510-544 (866 titles), numerous foot-refs. **DLC** (QE696.F54), **DWB** (551.59 F624gL)—Although this is considered a "new book" and not a second edition of the 1947 text by the same author, (for abstract on this title, *Glacial geology and the Pleistocene epoch*, *see G-114, July 1950, MAB*), the majority of chapters are the same, though great deal of additional material has been added (and an equal amount deleted), and most of the material has been revised and updated through 1956 to include the rich literature on pollen analysis, deep sea stratigraphy, permafrost and periglacial studies and C¹⁴ dating. Emphasis is on North American findings. The 27 chapters include: 2) origin and movement of glaciers; 3) regimen of glaciers; 4) distribution of glaciers in area and altitude; 5) glacial transport and erosion; 10) drainage and Eolian features; 11) frozen ground; 12) weathering and soils and streams; 13) lakes in nonglacial regions; 16) stratigraphy; 17) geochronology; 18) North America during the last glaciation; 22) glacial geology of Europe; 24) Pleistocene fossils and 27) causes, in which climatic changes and glacial climates are discussed extensively. (*Same item as 10.11-12, Nov. 1959, MAB.*) *Subject Headings: 1. Glacial geology textbooks 2. Pleistocene glaciation 3. Geochronology 4. Pollen analysis 5. North America.—M.R.*

11B-49

551.589 (4) :01

†Flohn, Hermann, *Witterung und Klima in Mitteleuropa*. [Weather and climate in Central Europe.] 2d rev. ed. Stuttgart, S. Hirzel, 1954. 214 p. 33 figs., 27 plates, 2 maps, 9 tables, 53 refs. (*Forschungen zur Deutschen Landeskunde*, Vol. 78.) **DLC** (G58.F73)—The general tenor of the text is the dynamic-synoptic approach to climatology. The excellent bibliography of 53 references is divided into several subject groupings: Methods and history of climatology (54 refs.), Singularities (191 refs.), Air masses (34 refs.), Synoptic meteorology (50 refs.), Climatology of central Europe (108 refs.), and Miscellaneous (33 refs.). The book serves as an excellent survey of the literature in the field as almost every subject treated is introduced by a running summary of the work (especially that of German meteorologists) on the subject. (*Same items as 5.9-3, Sept. 1955, and 6B-187, Feb. 1955, MAB.*) *Subject Headings: 1. Dynamic climatology textbooks 2. Bibliography on dynamic climatology 3. Central Europe.—M.R.*

11B-50

551.584(02):016

†Geiger, Rudolf, **Das Klima der bodennahen Luftschicht. Ein Lehrbuch der Mikroklimatologie.** [The climate near the ground. A textbook of microclimatology.] 3d ed. rev. and enl. Braunschweig, Vieweg, 1950. 460 p. 195 figs., tables, bibliog. p. 408-446. DLC (QC861.G45 1950). Eng. transl. of 2d German ed. with revisions and enlargements by author entitled **The climate near the ground.** Transl. by Milroy N. Stewart et al. for Blue Hill Meteorological Observatory, Harvard Univ., by the Harvard Univ. Press, 1957. 494 p. 181 figs., 63 tables, bibliog. p. 415-444; supplementary bibliog. p. 445-572. Price: \$6.00. DWB, DLC (QC861.G453)—The 41 chapters in the original text deal with day and night heat exchange at the ground; ground or soil temperature; eddy diffusion; long wave radiation; warming and cooling at the ground; diurnal and annual course of surface temperature; temperature gradients near the ground, humidity, wind, optical, acoustical and chemical properties of surface air, influence of ground temperature, soil type and condition, air layer above water, above snow, sod, relation to topography, frost pockets, slope and valley and glacier winds, sunshine on slopes and its effect, cave micrometeorology, influence of plant cover on radiation, temperature, humidity, wind, etc.; forest meteorology and climatology; radiation, temperature; humidity, precipitation, etc. in old stands, clearings and cuttings and on the edge of the forest; microclimate and man; artificial influences on climate; city climates; resort, clothing and bed climates; air conditioning; stable and greenhouse climates and, finally, frost and frost protection. The 1957 printing of the English translation (published in 1950) contains the bibliography of 821 references found in the 2d German edition plus 400 additional references bringing it up to date as of 1956, and a number of corrections and additions to the text. (See 2.1-158, 4C-291, 6B-72 and 8.8-14 for other abstracts on 1st English, 3rd German and 2d English editions, respectively.) (Same item as 4C 291 and 8.8-14, MAB.) *Subject Headings:* 1. Microclimatology textbooks 2. Microclimatology bibliographies 3. Forest climatology 4. Translations. I. Stewart, Milroy N. (transl.).—M.R.

11B-51

551.5(02) 551.509.3

†Godske, C. L.; Bergeron, Tor; Bjerknes, Jakob A. V. and Bundgaard, Robert C., **Dynamic meteorology and weather forecasting.** In continuation of **Dynamic meteorology and hydrography** (by V. Bjerknes and collaborators) and **Hydrodynamique physique avec applications à la météorologie dynamique**, [Physical hydrodynamics with applications to dynamic meteorology] (by) V. Bjerknes; J. Bjerknes; H. Solberg and T. Bergeron. Published jointly by American Meteorological Society, Boston, and by Carnegie Institution of Washington, Wash., D. C., 1957. (Foreword dated 1949; Manuscript submitted Feb. 1951.) 800 p. numerous figs., tables, eqs. Bibliog. at end of each chapter. *Carnegie Institution of Washington, Publication*, No. 605. DLC. Review by Sverre Pettersen in *Science*, Wash., D. C., 125(3252):829-830, April 26, 1957. DLC—This is one of the most impressive works on meteorology of the decade. The work of revising and bringing up to date the classical work of V. and J. BJERKNES et al. (1933-34) on **Physical hydrodynamics** was completed in 1948, before the death of the elder BJERKNES (who wrote the Preface in Feb. 1949, and to whose memory the volume is dedicated). Since most of the progress in meteorology in the past decade has been along lines of mechanization, automation and the like, the basic material in the book has not depreciated in the decade since the book was written—only a few topics such as microwave (radar) meteorology, numerical prediction, turbulent diffusion, the jet stream and cloud physics, have not been treated as fully as would be the case if the book were written today. It is not possible to mention all of the detailed titles of the 109 sub-chapters arranged under 18 following major chapters in 6 sections: I. Thermodynamics and statics of the atmosphere—(1) thermodynamics, (2) statics, (3) quasi-static diagnosis of atmospheric fields, (4) radiation processes; II. Kinematics of the atmosphere—(5) the vector field, (6) simple kinematic processes and principles, (7) 2-dimensional kinematic methods in forecasting; III. Hydrodynamics of the atmosphere—(8) atmospheric equations of motion and circulation theorems, (9) oscillating and circulating motions, (10) wave theory of cyclones and applications, (11) Vorticity, gradient winds, divergence and orographic effects, (12) turbulence; IV. Climatological and synoptic models—(13) average fields of temperature, pressure, heat transfer, etc., (14) air masses and fronts, (15) dynamical analysis of cyclones and anticyclones, (16) atmospheric tides and thermal, orographic, frictional and local modification of disturbances or currents; V. Weather forecasting—(17) synoptic analysis (observation codes, surface, upper air and composite maps), (18) forecasting (numerical, synoptic, special and extended). Excellent bibliographies, running into over 1000 completely cited references, are appended to each chapter. The historical and mid-historical material along the lines of the above subjects are not by any means slighted—very little material after 1948 (some as late as 1951) has been incorporated. (Same item as 8.7-5 and 11A-11, MAB.) *Subject Headings:* 1. Dynamic meteorology textbooks 2. Synoptic meteorology textbooks 3. Meteorology bibliographies. I. Bjerknes, V. II. American Meteorological Society.—M.R.

11B-52

551.508:551.501:551.551(02)

*†Gol'tsman, M. I., **Osnovy metodiki aerofizicheskikh izmerenii.** [Fundamentals of methodology of aerophysical measurements.] Moscow, Gos. Izd-vo Tekhniko-Teoret. Lit-ry, 1950. 360 p.

79 figs., 23 tables, eqs., 121 refs. **DLC** (QC871.G6)—This unusual textbook on specialized meteorological instruments begins with the theory of atmospheric turbulence, representativeness of observations, and accuracy of measurements due to the turbulent structure of the atmosphere as well as to instrumental characteristics. Then the author takes up in separate chapters the structure or nature of each of the important meteorological elements (temperature, humidity, pressure and wind), and the factors influencing the accuracy of instruments commonly used to measure each of these elements. The superiority of performance of the resistance thermometer (platinum wire) over that of the conventional psychrometer is due to the small lag (quick response), and to nondependence of reading on solar radiation or on ventilation. True air temperature can thus be measured for instant conditions or averaged over 2–3 min. Errors in shelters amount to 1°C or 10% relative humidity whichever system is used. Curves showing probable distribution of errors and actual readings are presented for each type of instrument. A number of original instruments for measuring micrometeorological elements are described and illustrated. The appendix (p. 346–354) discusses the measurement of vertical temperature, humidity and wind gradients. A long chapter (115 p.) devoted to wind measurements takes up measurement of horizontal and vertical velocities and includes several new vertical velocity instruments developed at the Central Geophysical Observatory in Leningrad. The extensive list of references is not limited to Soviet works. (*Same item* as 4.1–3, Jan. 1953, *MAB.*) *Subject Headings:* 1. Turbulence measurement 2. Micrometeorological instruments 3. Instrument accuracy 4. Micro-oscillations 5. Instrument textbooks.—A.A. and M.R.

11B-53

551.58(02):551.589

*†Gülübov, Zh. S., *Obshta klimatologiya*. [General climatology.] Sofia, Bulgaria, Durzhavno Izdatvo Nauka i Izkustvo, [1953]. 284 p. 127 figs. (some fold.), 89 tables, bibliogs. throughout. **DLC** (QC981.G8)—The meteorological factors affecting the geographical climate are treated in detail in the first 3 of the 5 major sections of the book. The chapters cover the history and concepts of climatology, structure and composition of the atmosphere, radiation, heat balance, temperature, pressure, wind, moisture, evaporation, cloudiness, precipitation, general circulation, cyclones, etc.; continentality, marine and topographic influences, vegetation and microclimate. In Pt. 4, the various classifications based on different concepts or applications, and some of the zonal climates of the earth are treated. In Pt. 5, the cosmic and telluric influences on climate and Quaternary climates are discussed. Extensive bibliographies (mostly of Russian source material) are appended to each section. The text is rich in illustrative data in tabular and graphic form and in theory. The general approach is synoptic-dynamic with little of the regional or ecological point-of-view evident. (*Same item* as 8.7–7, July 1957, *MAB.*) *Subject Headings:* 1. Climatology textbooks 2. Dynamic climatology.—M.R.

11B-54

551.510.53(02)

*†Goody, R. M. (*St. John's College, Cambridge*), *The physics of the stratosphere*. Cambridge, University Press, 1954. 187 p. 60 figs., 17 tables, bibliog. p. 176–181, eqs. Price: \$5.00. (*Cambridge Monographs on Physics*). **DLC** (QC879.G68). Transl. into Russian by S. F. Shushurin, ed. by E. G. Shvidkovskii, with title *Fizika stratosfery*. Issued Leningrad, Gidrometeoizdat, 1958. 171 p. 61 figs., 17 tables, 214 refs., eqs.—A simple but up-to-date and accurate treatment of the structure, composition and energy conditions in the upper atmosphere, with emphasis on experimental rather than theoretical results. The latest equipment, including rockets, is considered. The layer between that wherein "weather" plays an important role, and the ionosphere (e.g., from 12 to 80 km) is emphasized. The several chapters take up the following subjects: 1) Discovery and nomenclature of stratosphere; 2) Temperature and its measurement by sound propagation, meteor and rocket techniques; 3) Composition (H_2O , CO_2 , rare gases, etc.); 4) Ozone; 5) Winds and turbulence in the stratosphere; 6) Radiation. The last chapter is especially complete and up-to-date, taking up the latest theoretical and experimental knowledge of the radiation balance in the stratosphere, the effects of various gases (H_2O , CO_2 , NO and O_3) on the absorption of solar and terrestrial radiation, line shapes, spectroscopy and, finally, the effect of radiation balance on tropopause temperatures and vice versa. (*Same item* as 5.5–5, May 1954, *MAB.*) *Subject Headings:* 1. Upper atmosphere physics textbooks. I. Shushurin, S. F. (transl.).—M.R.

11B-55

519.2:551.58(02) 551.577.37

*†Gumbel, E. J. (*Columbia Univ.*), *Statistics of extremes*. N. Y., Columbia Univ. Press, 1958. 375 p. graphs, tables, eqs. Bibliog. (about 500 refs.) p. 349–371. Price: \$15.00. **DLC** (QA276.G82)—A unique textbook for engineers, statisticians, meteorologists, hydrologists, climatologists, etc., giving in the simplest possible form the developments and applications of modern theory of extreme values needed for practical calculations of rare events. The eight major chapters cover: I. History, methodology and specific tools; II. Order statistics and their exceedances; III. Exact distribution of extremes; IV. Analytical study of extremes; V. First asymptotic distribution; VI. Uses of the first asymptote; VII. Second and third asymptotes; and VIII. Asymptotic

distributions of range and midrange, external quotients and geometric range. The only mathematics needed to use this book is simple "calculus, analysis statistics and probability theory." Graphical methods are used wherever possible. Useful nomograms and tables, and many practical illustrations from hydrology and climatology are plentiful. The excellent bibliography of >600 items covers most of the world's literature on application of theory of extreme values to meteorology and hydrology, etc. through 1956. In the climatological example on p. 341-344 (Washington, D. C., Dew points, 1905-45), the Jan. and July values are reversed on both the graph and in the tables and analysis. (Same item as 10.7-14 and 11A-49, MAB.) *Subject Headings:* 1. Statistics of extremes 2. Extreme value theories 3. Statistical methods in climatology 4. Flood frequency calculations.—M.R.

11B-56

551.586:615.838(02)

†Haeberlin, Carl and Goeters, W., *Grundlagen der Meeresheilkunde*. [Fundamentals of marine resort medicine.] Stuttgart, G. Thieme, 1954. 264 p. 21 figs., bibliog. p. 188-251. Meteorological introd. by W. Leistner and clinical report by E. Kruger and (Dr.) Zürcher. DWB 615.853 H133gr. Review in *Meteorologische Rundschau*, Berlin, 11(1):40, Jan./Feb. 1958.—A most thorough and well-edited text on the various aspects of sea resort therapy starting in Pt. I with the meteorological aspects (p. 1-44); going on in Pt. II with the medicinal aspects (p. 45-185), including the history, physiological effects of marine climate, particular effects on asthma, skin diseases, metabolism, cardiac and circulatory system, blood, nervous system, tuberculosis, female disorders, rheumatics, etc.; and, finally, in Pt. III giving a perspective of the different characteristics of various resort places on the North Sea and Baltic. An extremely thorough bibliography and detailed subject index is appended. (Same item as 10.8-11, August, 1959, MAB.) *Subject Headings:* 1. Thallaso-therapy textbooks 2. Balneology bibliographies 3. Climatotherapy. I. Leistner, W. II. Kruger, E. III. Zürcher, (Dr.).—M.R.

11B-57

551.511(02) 551.509.313

*Haltiner, George J. and Martin, Frank L. (both, U. S. Naval Postgraduate School, Monterey, Calif.), *Dynamical and physical meteorology*. N. Y., McGraw-Hill, 1957. 470 p. tables, numerous figs. and eqs. Bibliog. at end of each ch. DLC (QC861.H12)—A basic text in dynamic (and to some extent physical) meteorology for university students majoring in meteorology. The 23 chapters cover: 1) vector notation and use, 2) thermodynamics of dry air, 3) moist air, 4) hydrostatics, 5) convection and stability, 6) radiation in general, 7) solar radiation, 8) terrestrial radiation, 9) radiative balance and synoptic aspects involved, 10) earth-atmosphere mean heat balance, 11) equations of motion, 12) horizontal flow, 13) vertical wind and pressure variations, 14) wind structure near the ground, 15) diffusion of heat and moisture, 16) diffusion of pollutants in atmosphere, 17) frontogenesis, 18) discontinuity surfaces, 19) pressure change mechanism, 20) vorticity and circulation, 21) perturbation theory, 22) numerical forecasting and 23) general circulation. An advanced text such as this is essential for the many students who are going into numerical prediction and related synoptic analysis fields. Vector notation is used throughout the text. (Same item as 9.4-5, April 1958, MAB.) *Subject Headings:* 1. Dynamic meteorology textbooks 2. Numerical forecasting.—M.R.

11B-58

551.501.1:551.508:551.501.9(02)

†Haynes, Benarthur C., *Techniques of observing the weather*. New York, John Wiley and Sons, inc., 1947 (reprinted 1950). 272 p. forms, illus., tables, refs., bibliog. p. 197-205. DWB, DLC QC871.H38)—The following subjects are treated in a concise and lucid manner, aimed at the potential or actual observer, but not the trained meteorologist: the atmosphere, the weather observatory, clouds, visibility, hydrometeors, temperature, humidity, wind, pressure, precipitation, winds aloft, automatic weather stations, radar storm detection, and an appendix containing an extensive bibliography and conversion tables, work sheets, etc. for practical use in observation. An especially large number of photos and diagrams of instruments, cloud photographs, nomograms, observational instructions and sample forms are included. The last chapter tells how to set up an inexpensive or improvised weather station, with many drawings of different types of instrument shelter, rain gauge, anemometer, wind vane, hair hygrometer, aneroid barometer, and thermometer (bi-metallic), and concise instructions for operation and observations, etc. (Same item as 3.9-7, Sept. 1952, MAB.) *Subject Headings:* 1. Observation technique textbooks 2. Meteorological instruments 3. Amateur weather stations 4. Instrument exposure.—M.R.

11B-59

551.5(02) 551.509.313

†Hess, Seymour L. (Fla. State Univ.), *Introduction to theoretical meteorology*. New York, Henry Holt and Co., 1959. 362 p. numerous figs., tables, foot-refs., eqs. DLC (QC880.H4)—A new type of elementary college textbook with major attention to theoretical aspects of meteorology

usually given only incidental emphasis in descriptive texts. Thermo- and hydro-dynamics and radiation theory are treated without use of advanced mathematics (such as vector analysis), with ample graphical illustrations and considerable basic calculus. Applications are limited to numerical weather prediction, the general circulation and turbulent exchange problems. Oddly, no mention is made, either favorably or critically, of FERREL's simple solutions of the planetary circulation or his cyclonic circulation model, the most notable of the simple theoretical circulation models of the past century, although recognition is given to the work of LANGLEY, ABBOT, HELMHOLTZ, CORIOLIS, BIGELOW and earlier notables such as HADLEY, MARGULES and others. The score of chapter headings after a short introductory chapter, deal with equation of state, principles of thermodynamics, thermodynamics of water vapor and moist air, thermodynamic diagrams, hydrostatic equilibrium, stability and convection, physics of radiation, solar and terrestrial radiation, application to earth-atmosphere radiation balance, equations of motion, steady horizontal motion, kinematics of fluid flow, pressure changes, discontinuity surfaces, circulation, vorticity and divergence theorems, basic equations with pressure as independent coordinate, viscosity and turbulence energy and stability, numerical prediction and, finally, the general circulation. The appendices give numerical constants and conversions, and a derivation of Gauss' divergence theorem. An author-subject index and a long list of symbols used are appended. A few problems are given at the end of each chapter. *Subject Headings:* 1. Theoretical meteorology textbooks 2. Numerical forecasting.—M.R.

11B-60

550.3(0)

†Howell, Benjamin Franklin, Jr. (*Dept. Geophysics and Geochemistry, Penn. State Univ.*), *Introduction to geophysics*. N. Y., McGraw-Hill, 1959. 399 p. numerous figs., tables, eqs., bibliography, p. 375-378. (*McGraw-Hill Series in the Geological Sciences*, ed. by Robert R. Shrock.) *DLC* (QE501.H73)—A thorough textbook for general college courses in earth sciences based on the current fundamental theories and knowledge of the origins, age and size of the universe, solar system, earth, moon, oceans and continents; earth temperatures and sources of heat, density, gravity, isostasy, tectonic forces, continental drift, geomagnetism, atmospheric and terrestrial electricity, and instruments for measuring these parameters. An excellent bibliography and combined author and subject index are appended. (*Same item as* 11.1-13, Jan. 1960, *MAB.*) *Subject Headings:* 1. Geophysics textbooks 2. Seismology 3. Cosmogony 4. Geodesy 5. Origin of earth 6. Geomagnetism.—M.R.

11B-61

551.481.1(0)

*†Hutchinson, George Evelyn (*Dept. of Zoology, Yale Univ.*), *Treatise on limnology*, Vol. 1. *Geography, physics, and chemistry*. New York, John Wiley; London, Chapman & Hall, 1959. 1015 p. 228 figs., 132 tables, bibliog. and index of authors, p. 913-978. List of symbols, p. 903-912. *DLC* (QH98.H82)—This first of an ambitious two-volume work on all aspects of limnology treats of the physical aspects of lakes. The second volume will cover the biological, ecological and stratigraphic aspects. Of special interest to meteorologists and hydrologists are the following chapters: 1) origin of lakes; 2) morphology; 3) properties of water; 4) hydrologic cycle and water balance; 5) hydromechanics of lakes; 6) optical properties; 7) thermal properties; 8) inorganic ions; rain, lakes and rivers; 9) oxygen in lake water; 10) CO₂ and pH concentration. Each section is quite extensive, covering most known material available in literature up to 1954, with over 1600 references cited in the bibliography, and with a great deal of data presented in graphs, tables and on charts. The book may be used either as a textbook or a reference work. (*Same item as* 9.9-6 and 11A-5, *MAB.*) *Subject Headings:* 1. Limnology textbooks 2. Limnology bibliographies.—M.R.

11B-62

550.38:551.594.5(0)

†Ivanovskii, B. M., *Zemnoi magnetizm*. [Geomagnetism.] 2d ed. Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoi Literatury, 1953. 591 p. 272 figs., 46 tables, 87 refs., numerous equations. *DLC* (QC815-I3)—A thorough and systematic textbook on terrestrial magnetism, divided into four main parts in addition to an extensive introductory section covering the history, basic physical principles, etc. Pt. I covers the constant magnetic field of the earth and the secular changes thereof. Pt. II, the variable magnetic field, including the relationships with auroras, ionospheric storms, solar phenomena, etc.; Pt. III, practical applications such as magnetic prospecting by various methods and deviation affecting navigation by compass; Pt. IV deals with instruments and methods of measurement of geomagnetic parameters, magnetic anomalies, variations, astronomical measurements, etc. Appended is a list of magnetic observatories and their coordinates and tables of magnetic deviations and of inclination and declination. A bibliography of 87 items arranged under the various headings of the 4 main parts, and a good author and subject index are also appended. The textbook is heavily weighted on the side of the theoretical aspects, although applications are not neglected. (*Same item as* 6B-151, Feb. 1955, *MAB.*) *Subject Headings:* 1. Terrestrial magnetism textbooks 2. Auroras.—M.R.

11B-63

551.594(02)

Israel, Hans, *Luftelektrizität und Radioaktivität*. [Atmospheric electricity and radioactivity.] Bern, Springer Verlag, 1957. 125 p. 86 figs., 6 tables, foot-refs. **DLC** (QC961.18)—This small up-to-date book contains 8 chapters on: I. General and instrumental aspects of atmospheric electricity; II. Physical and molecular aspects (ionization of gases); III. Aerosols (small ions, large ions, condensation nuclei, aerosols and weather); IV. Atmospheric electricity fields and currents due to turbulent exchange, thunderstorms or precipitation; V. Theory and application of atmospheric electricity fields and currents, climatological and synoptic and macro-aspects; VI. Thunderstorm electricity (lightning and charge formation spheres); VII. Radioactive ionization, natural and artificial radioactivity in the atmosphere; and VIII. Biological aspects of atmospheric electricity. A good subject index is provided. The book contains some data and numerous schematic diagrams. (Same item as 8.9-5, Sept. 1957, *MAB*.) *Subject Headings: 1. Atmospheric electricity textbooks 2. Radioactivity in the atmosphere 3. Thunderstorm electricity.*—*M.R.*

11B-64

551.521.64(02)

†Jánossy, Lewis, *Cosmic rays*. 2d ed. Oxford, Clarendon Press, 1950. 454 p. 141 figs., 10 plates, 9 tables, bibliog. p. 431-442. (*International Series of Monographs on Physics*.) **DLC** (QC485.J3 1950)—This 2d edition contains a few changes over the first (1948) edition to take care of new advances, but does not constitute a complete revision. It deals in an orderly manner with both the theoretical and the experimental results of research on the various aspects of the subject, without going into great detail on the quantum theory or measuring techniques. The first four chapters cover the discovery, nature, measurement, theory, and behavior of cosmic rays at sea level or underground. Ch. 5 deals with mesons; 6, the soft component; 7, geomagnetic effects; 8, air showers and 9, the origin of the meson component. Appendices go into statistical treatment of observations, electron currents, photography, etc. (Same item as 7C-58, March 1956, *MAB*.) *Subject Headings: 1. Cosmic ray textbooks 2. Cosmic radiation.*—*M.R.*

11B-65

551.521.64(02)

†Jelley, J. V., *Čerenkov radiation and its applications*. Published for the United Kingdom Atomic Energy Authority. New York, Pergamon Press, 1958. 304 p. figs., tables, bibliog. p. 289-296, eqs. Price: \$10.00. **DWB, DLC** (QC475.J42). Review by E. P. Hincks in *Science*, Wash., D. C., 129 (3358):1273, May 8, 1959.—The first thorough review in book form of the theoretical, experimental and applied aspects of this peculiar form of radiation named Čerenkov radiation after its discoverer. The field is narrow but touches on nuclear physics, optics, high frequency radio techniques, astrophysics and cosmic rays. The faint, bluish-white light, given off by transparent objects in proximity to radioactive sources, was first noticed in 1910 by MADAME CURIE, was studied by L. MALLÉ in 1926-1929, but was not identified and explained until 1934-1938. Applications to measurement of speed of high energy particles, night airglow, cosmic rays, etc. arose from the use of the photomultiplier and the resulting scintillation counter. Generation of microwaves by Čerenkov radiation is also considered. The photomultiplier and Čerenkov detectors are treated in detail. Optical considerations, design of counters, Čerenkov radiation in the atmosphere, gas counters and miscellaneous aspects are treated in several chapters. Light pulses from the night sky were discovered during cosmic ray shower in 1953. (Same item as 10.6-7, June 1959, *MAB*.) *Subject Headings: 1. Čerenkov radiation 2. Night airglow Čerenkov radiation 3. Cosmic ray Čerenkov radiation.*—*M.R.*

11B-66

551.5(02)

*†Johnson, John Clark (*Research Lab. of Physical Electronics, Tufts College*), *Physical meteorology*. N. Y., John Wiley; London, Chapman and Hall, 1954. 393 p. numerous figs., tables, refs. at end of each chap., eqs. Price: \$7.50. **DLC** (QC861.J6)—This modern textbook is the result of several years of teaching courses in physical meteorology at M.I.T. and research done by the author and colleagues at that institution. The subjects covered in separate chapter are: 1) atmospheric reflection, 2) scattering, 3) visibility, 4) radiation processes, 5) heat budget of earth, 6) atmospheric optics and turbidity effects, 7) cloud physics, 8) artificial precipitation, icing and radar meteorology, 9) atmospheric electricity, 10) ionosphere and ozonosphere, 11) temperature, density and humidity of upper atmosphere. The text presupposes knowledge of calculus. The bibliographies at the ends of the chapters are fairly extensive and well chosen and the text nicely edited and printed. An index completes the book. (Same item as 5.9-6, Sept. 1954, *MAB*.) *Subject Heading: 1. Physical meteorology textbooks.*—*M.R.*

11B-67

551.501.7(02)

†Kalinovskii, Aleksandr Boleslavovich and Pinus, N. Z., *Aerologija: metody aerologicheskikh rabot*. [Aerology: methods of aerological observations.] Leningrad, Gidrometeoizdat., 1951. 452 p. 245 figs. (incl. photos), tables, foot-refs., eqs., 164 refs., p. 423-428. **DLC**

(QC879.K3)—A unique textbook for students intending to pursue practical hydrometeorological and aerological work. The various chapters consist of I. History and development, especially in U.S.S.R.; II. Pilot balloon observations; III. Meteorograph and its calibration, accuracy and correction; IV. Kite, captive, and manned balloon observations; V. Sounding (free) balloon ascents; VI. Airplane soundings; VII. Computations of meteorograph records; VIII. Radiosondes (various types described in detail and compared); IX. Radio-location applied to soundings; X. Measurement of vertical currents; XI. Cloud and cloud physics measurements; XII. Rocket research; XIII. Publication of aerological "yearbooks" or summaries and machine methods of computation (80 column IBM-type cards and punchers, sorters and tabulator illustrated). The detailed theory that enters into each method of observation or instrument use; calculation of data, etc.; and actual comparative value and accuracy of instrument elements, design and construction of instruments and photographs of equipment are included. The bibliography of 164 references arranged by chapters consists mainly of Russian sources, but a dozen or more German, U. S. or British references are cited. Material recent as 1950 is included. A chapter on rockets gives comparative data for V-2 and Wac-Corporation Rocket flights and standard atmospheric data to 100 km height. Chapter on radio-location includes brief mention of radar storm detection methods. (*Some item as 6.7-10, July 1955, MAB.*) *Subject Headings:* 1. Upper air observation techniques 2. Machine methods of aerological computation 3. Upper atmosphere instruments 4. Radiosondes 5. Aerology textbooks.—M.R.

11B-68

551.508(0)

†Kedrolivanskiĭ, V. N. and Sternzat, M. S., *Meteorologicheskie pribory*. [Meteorological instruments.] Leningrad, Gidrometeoizdat., 1953. 544 p. 403 + figs., 31 + tables, bibliog. p. 49. 500, 463 eqs., appends. **DLC** (QC876.R37), **DWB**—An advanced textbook on meteorological instruments and apparatus used specifically by the Hydrometeorological Service and by scientific research institutions, observatories and expeditions of the U.S.S.R. The book attempts to give a theoretical and physical basis for an understanding of the operation and the results of such instruments, and is intended for students in universities and government training courses. The only books of equivalent competence are those of CLEVELAND ABBE (1888), KLEINSCHMIDT (1935), and MIDDLETON and SPILHAUS (1953). The present text is based (at least 95%) on Russian literature and equipment, although the general principles are universal. The separate chapters cover measurements of I. Temperature, II. Humidity, III. Evaporation, IV. Precipitation, V. Clouds, VI. Radiation (actinometry), VII. Pressure, VIII. Wind, IX. Atmospheric electricity, X. Visibility and illumination, and XI. Complex conversion and reduction tables. A five page bibliography, arranged by chapters, is included. The special instruments for aerological, oceanographic or hydrological observations are not covered in this text as those subjects are covered in detail in the recent texts of KALINOVSKIĭ and PINUS (1951). Rather, the authors confine themselves to equipment for surface observations including such special apparatus as hot wire anemometers, measurement of vertical velocities, dust or nuclei content of air, drop size and liquid water content of air, radiation balance, electrical charge, soil temperature and moisture measurements, etc. Hundreds of schematic diagrams and illustrations add to the value and interest of the volume. (For more recent textbook along similar lines, see 11B-134.) (*Same item as 5.11-4, Nov. 1954, MAB.*) *Subject Headings:* 1. Meteorological instruments 2. Instrument textbooks.—M.R.

11B-69

551.58(0)

*†Kendrew, W. G., *Climatology*. 2d ed. London, Oxford Univ. Press, 1957. 400 p. 131 figs., tables, bibliog. p. 384-385. Price: 42 sh. **DLC** (QC861.K4 1957). Review by H. H. Lamb, *Meteorological Magazine*, London, 87 (1036): 315, Oct. 1958. Review in *Weather*, London, 13 (6): 20, June 1958.—This second edition of the most widely known textbook on climatology has been revised and reset from the 1949 first ed. with "many minor and a few major changes," particularly with respect to upper air climatology. The 1949 edition itself constituted a "3rd ed." of his work, *Climatology*, originally issued 1930 and 1938. The simple outline arranges the 41 chapters into 6 major parts: I. Insolation and temperature; II. Pressure and winds; III. Moisture, cloud, sunshine and visibility; IV. Mountain and plateau climate; V. Weather of the westerlies and VI. Climatic types. A new section in Ch. 16 (Pressure and wind belts) gives a full treatment of the major features of the jet stream (p. 166-172), its relation to surface relief, surface weather, the tropopause, etc. especially over North America. Upper air sounding by radar, rocket and radiosonde are touched on. The synoptic charts used for illustrating weather types, and the climatic charts, graphs and photographic plates, are well chosen. (For 1949 ed., see 8-108, Aug. 1950, *MAB.*) (*Same item as 10.6-9, July 1959, MAB.*) *Subject Heading:* 1. Climatology textbooks.—M.R.

11B-70

551.582(0)

*†Kendrew, Wilfrid George, *The climates of the continents*. 4th ed. Oxford, Clarendon Press, 1953. 607 p. 194 figs. (incl. charts & graphs), numerous tables, bibliog. p. 579-584. **DLC** (QC981.K4 1953), **DWB**—The book has been enlarged and many sections have been rewritten since

the 1937 3rd ed. (reissued 1948) to bring the treatment up to date. Nearly all the climatic means have been revised, and data for many new stations added. Several new tables are included of wind directions, diurnal temperatures, sunshine, fog, and other elements. Since the first edition in 1922 this work has been the standard source of information about the climate of any region in the world for the English speaking student. Though giving extensive tables of data for countless locations, the scope of the work naturally precludes much frequency or other analytical data (except for wind direction, cloud height and amount, and visibility frequencies and some synoptic climatology for North America), though extremes as well as means are presented in the tables, charts and discussion. Recent material is evident in chapters on Tibet, Antarctica, etc. (for 3rd ed., 1937, see 3C-17, March 1952, MAB.) (Same item as 6.4-1, April 1955, MAB.) *Subject Headings:* 1. Climate of continents 2. Climatic data 3. Climatology textbooks.—M.R.

11B-71

551.5(02)

*†Khragian, Aleksandr Khristoforovich, *Fizika atmosfery*. [Physics of the atmosphere.] 3d ed. Moscow, Gos. Izdat. Fiziko-Matematicheskoi Literatury, 1958. 476 p. 218 figs., 116 tables, numerous refs., bibliog. p. 472. **DLC** (QC880.K45 1958)—This new edition of KHRGIAN's competent text on the physics of the atmosphere (for abstract on first ed., 1953, see 5.7-7, July 1954, MAB), contains about the same amount of tabular and illustrative material on the quantitative aspects of meteorology as did the 1953 edition, but has been amplified by inclusion of recent data and findings in fields such as radiation balance, cloud physics, artificial precipitation, upper atmosphere temperature and density, tropical cyclones, fronts, general circulation, monsoons, etc. References are cited for most of the work quoted or reproduced from non-Russian sources, thus eliminating the one serious defect in the first edition. The book is also published on better quality paper and is about 20 pages larger than was the 1953 edition (also the price has gone up 20% or 3 rubles). The 22 chapters include: 1) Composition of atmosphere, 2) Ozone, 3) Dust, 4) Water vapor, 5) Static, 6) Adiabatic processes, 7) Solar radiation, 8) Terrestrial radiation, 9) Heat exchange in soil and water and snow cover, 10) Temperature distribution, 11) Atmospheric radiation balance, 12) Temperature of upper atmosphere, 13) Evaporation, 14) Condensation in atmosphere, 15) Cloud and fog, 16) Precipitation formation, 17) Precipitation types, 18) Wind and turbulence, 19) Dynamics of circulation, 20) Fronts and cyclones, 21) Local winds, 22) General circulation over earth or parts of earth. A good subject index is included. On p. 316 it is stated that "In 1947, V. SHAEFFER in the U. S. and V. V. PROTCHIKOVICH in the U.S.S.R., demonstrated that particles of solid CO₂ would produce rapid coalescent precipitation from supercooled clouds or fog." (Same item as 10.7-8, July 1959, MAB.) *Subject Headings:* 1. Atmospheric physics textbooks 2. Meteorology textbooks.—M.R.

11B-72

551.509.2/3(02)

*†Khromov, Sergei Petrovich, *Osnovy sinopticheskoi meteorologii*. [Basic synoptic meteorology.] Leningrad, Gidrometeoizdat, 1948. 696 p. 277 figs., 6 fold. charts, tables, bibliog. p. 684-696. **DWB, GB-MO**—A most satisfactory and systematic general textbook on synoptic meteorology, analysis and forecasting (short range, specialized and extended forecasting) which has not been improved upon in the past decade. The 1948 ed. has several chapters which were not in the 1934 and 1937 editions (*Vvedenie v sinopticheskiĭ analiz*), or the 1940 edition (*Sinopticheskaiia meteorologiya*). In the 1948 edition, V. A. BUGAEV is responsible for paragraphs 12 to 18, 26 and 34 and parts of 29, 30 and 70, and helped the author write paragraphs 19 and 20. N. L. TABOROVSKIĭ wrote paragraph 59 and parts of 31, 51, 57, 70, 71, 72 and 73; A. S. ZVEREV, paragraphs 75, 78, 79, and 80; and G. IA. VANGENGĖIM and B. L. DZERDZEEVSKIĭ, paragraph 85. The book is arranged in 10 main parts (90 paragraphs): 1. Introduction (paragraphs 1-4) covering history, methods, structure and concepts; 2. Tools for synoptic analysis (paragraphs 5-21) covering reports, charts, errors, methods of analysis of complex charts, aerological diagrams, cross sections, isentropic charts; 3. Basic fields and wind (paragraphs 22-31); 4. Air masses (paragraphs 32-38); 5. Fronts (paragraphs 39-47); 6. Cyclonic activity (paragraphs 48-59); 7. General circulation (paragraphs 60-69); 8. Forecasting synoptic situations (paragraphs 70-75); 9. Forecasting weather (paragraphs 76-83); 10. Large scale weather and long range forecasting (paragraphs 84-90). (For abstract on this chapter, see 2A-29, Jan. 1951, MAB.) Literature through 1947 is covered in a bibliography (arranged by chapters) which refers to basic native and foreign texts and monographs in good perspective. (See also 10.1-63, Jan. 1959, MAB.) (Same item as 10.2-14, Feb. 1959, MAB.) *Subject Heading:* 1. Synoptic meteorology textbooks.—M.R.

11B-73

551.521.326(02) 551.594.51:016

*†Khvostikov, I. A., *Svechenie nochnogo neba*. [Light of the night sky.] 2d rev. ed. Moscow, Akademiia Nauk, 1948. 495 p. plates, diagrs., 434 refs., eqs. **DLC** (QC976.N5K5 1948)—This book reviews knowledge of the luminous phenomena in the upper atmosphere in a systematic fashion, and presents a list of 434 references to articles (50 in Russian periodicals) on aurora, light of the night sky, green line, sodium, oxygen, infrared radiation, fluorescence, polarization, sunlit auroras, nocti-

lucent clouds, meteor trails, etc. (*Same item as 2.10-99; 4J-245; 6B-52, MAB.*) *Subject Headings:* 1. Night airglow textbooks 2. Auroral physics bibliographies.—*M.R.*

11B-74

551.509.312(0)

§†Kibel', Ivan Afanas'evich, *Vvedenie v gidrodinamicheskie metody kratkosrochnogo prognoza pogody*. [Introduction to hydrodynamic methods of short range weather forecasting.] Moscow, Gos. Izdvo Tekhniko-Teoret. Lit-ry, 1957. 375 p. 98 figs. (some fold.), foot-refs., numerous eqs. **DLC** (QC995.K5)—This is the long-awaited text on hydrodynamic methods of short range forecasting by the renowned author and teacher of single station numerical weather forecasting. More advanced theoretical texts have been published by KOCHIN, KIBEL' and ROZE (*see 6.5-7, May 1955 and 9.11-11 Nov. 1958, MAB*) and by BELINSKIĭ (*see 9.10-6, Oct. 1958, MAB*), but this is the first standard text on hydrodynamic numerical prediction and is completely authoritative. The 12 chapters which are replete with both theory and with illustrative diagrams and synoptic charts are concerned with: (1) boundary layer problems of the atmosphere, (2) hydrodynamic and thermodynamic equations applied to the free atmosphere, (3) the order or scale of atmospheric motions, (4) settling up the equations for forecasting and relating motions to the geostrophic, (5) forecasting for meteorospheric levels (various models and linearization problems), (6) extrapolation of linear quasisolonoidal equations for forecasting, (7) basic prognostic equations, use of Green's function, transformation of meteorological parameters with time and for vertical motions (geopotential), (8) nonlinear forecast problems for mid-levels and use of electronic computers, with various models used in U.S.S.R. and abroad, (9) extrapolation of nonlinear equations and solution by electric computers, (10) frontal zones and frontal surfaces, solenoidal movements, (11) orographic and friction effects, (12) thermal transformations and forecasting for the stratosphere. Synoptic applications are as a rule for Europe or Eurasian sectors of the Northern Hemisphere 500 mb charts, but sometimes for 700 mb. References are to the major works of Soviet and Western authors. (*Same item as 10.2-13, Feb. 1959, MAB.*) *Subject Headings:* 1. Numerical forecasting textbooks 2. Hydrodynamic short range forecasting.—*M.R.*

11B-75

532.5(02) 551.515

†Kochin, N. E.; Kibel', I. A. and Roze, N. V., *Teoreticheskaya gidromekhanika*. [Theoretical hydromechanics.] Rev. 4th ed., ed. by I. A. Kibel'. Leningrad, Gosud. Izdat. Tekhniko-Teoreticheskoi Literatury, 1948. 2 vol. Vol. 1, 535 p. 179 figs., bibliog. p. 527-530, numerous eqs. Vol. 2, 612 p. 156 figs., bibliog. p. 605-607, numerous eqs. **DLC** (QA901.K5). (Note: **DLC** describes Vol. 1 as of 4th ed. Vol. 2 as of 3d ed.) Vol. 1 of 5th ed., ed. by I. A. Kibel', issued Moscow 1955. 560 p. 183 figs., bibliog. p. 552-556, numerous eqs. **DLC** (QA901.K52). German ed. *Theoretische Hydromechanik*. Berlin, Akademie Verlag, 1954-1955. 2 vol. Vol. 1, issued 1955. 508 p. 179 figs., foot-refs., numerous eqs. Vol. 2, issued 1955. 569 p. 156 figs., 11 tables. Price of vol. 2, 48 DM. Transl. of original Russian, 4th ed., 1948. Vol. 1 transl. by J. Sauer. Vol. 1 transl. by K. Krienes. **DLC** (QA901.K527). Review of Vol. 1 by O. G. Sutton in *Met. Mag.* 84(991):27, Jan. 1955. Review of Vol. 2 by T. V. Davies in *Royal Met. Soc., Quarterly Journal* 82(353):378, July 1956.—The several parts of this voluminous and highly theoretical treatise (a collection of treatises) cover in the first volume: I. Kinematics of fluids (A. Deformation fields; B. Equations of continuity, C. Kinematics of rectilinear and vortex motion); II. Basic equations of hydrodynamics of ideal fluids; III. Hydrostatics; IV. Simple cases of motion in ideal fluids; V. Eddy motion in ideal fluids (KOCHIN); VI. Simple problems of movement of bodies in ideal fluids; VII. Extension of problems of motion in an ideal fluid; VIII. Wave motions in an ideal fluid, including basic equations, simple waves, 3-dimensional waves and long waves (KOCHIN). The second volume covers: I. Theoretical basis of gas dynamics (KIBEL'); II. Movement of viscous fluids (KOCHIN); III. Elementary theory of turbulence (KIBEL'). The 5th ed. of Vol. 1 contains about 25 more pages than the 4th (1948) ed. The most important additions were found in Ch. VIII (*Wave motions in an ideal fluid*), where several paragraphs have been added to provide detailed solutions for general and special cases of wave motion in an ideal compressible baroclinic fluid over a mountain range of infinite length and the case of an isothermal atmosphere with varying heights of tropopause, the case of standing waves, vorticity in relation to formation of ridges and troughs, centers of action, Rossby's theory, etc. all additions by I. KIBEL'. The German ed. is of great value to those who do not read Russian: (*Same item as 6.5-7, 9.11-7, 9.11-8 and 11A-15, MAB.*) *Subject Headings:* 1. Hydrodynamics textbooks 2. Turbulence theories 3. Eddy motion. I. Kibel', I. A. (ed.) II. Sauer, J. (ed.).—*M.R.*

11B-76

551.515.4:551.509.5(02) 551.515

*§†Kolobkov, N. V., *Grozy i shkvaly*. [Thunderstorms and squalls.] Moscow, Gos. Izdat. 1951. 355 p. 148 figs., 31 tables, 155 refs. **DLC** (QC968.K6 1951)—Another work with the same title which appeared in 1939 (*see E-75 and H-83, May, Aug. 1950, MAB*) was the most complete scientific work on thunderstorms and tornadoes at that time. The present book is based upon the earlier work, several other books by the author and additional research material. The text

divided into 3 main parts: I. Thunderstorms, atmospheric electricity, lightning, hail, cloud physics; II. Synoptic and aerological aspects of thunderstorms, thermodynamics, flight through thunderstorms and forecasting same. The bibliography is very complete, containing 123 references to Soviet literature and 33 to Western treatises. The emphasis in the forecasting section is placed on recent developments in upper air synoptic methodology such as charts of relative and absolute topography supplemented by series recording and location methods, the use of thermodynamic charts and cross sections, moisture content analysis, as well as by cloud observation. The book is well worth translating into English. The chapter on tornadoes is illustrated by photos of tornadoes in the U. S. and the U.S.S.R. and of damage to trees and structures, drawings of paths of tornadoes and synoptic charts during tornado occurrence. A popular rendition of this work appeared under the title *Grozy i bur'i* [Thunderstorms and other storms] in two editions: 1949 and 1951 (see 3.10-137, Oct. 1952, MAB). (Same item as 5.8-4, Aug. 1954, MAB.) *Subject Headings:* 1. Thunderstorms 2. Squalls 3. Thunderstorm forecasting 4. Tornadoes 5. Textbooks 6. U.S.S.R.—M.R.

11B-77

551.521.18

†Kondrat'ev, K. Ia., *Perenos dlinnovolnovogo izlucheniia v atmosfere*. [Transfer of long wave radiation in the atmosphere.] Moscow, Gos. Izd-vo. Tekhniko-Teoret. Lit-ry, 1950. 287 p. 47 figs., 26 tables, 71 refs., eqs. **DLC** (QC911.K63)—A systematic presentation of many aspects of the problem of long wave radiation, absorption and transfer of energy in the atmosphere based on theory of a few non-Russian (ELSASSER, MÖLLER and others) and many native scientists (KUZNETSOV, KONDRAT'EV, KASTROV, EVFIMOV, KIBEL' and others). The five chapters (34 sections) take up: 1) absorption of long wave radiation (theory, measurement of spectral lines and bands, dependence of pressure and temperature, infrared absorption by water vapor, ozone, CO₂ and other atmospheric constituents, instrumental procedures, etc.); 2) general theory and laws of radiative transfer (heat exchange, monochromatic radiation, characteristics of Exponential integral (En) function, transfer of nonmonochromatic radiation, diffuse radiative propagation); 3) approximate methods of calculating diffuse and direct radiation (by graphical and numerical methods) for different heights in the atmosphere, out-going radiation; 4) effective radiation from the ground (empirical methods of calculation, errors in measurement and calculation, theory, effect of inversion, cloudiness, spectral distribution of effective radiation and counter-radiation, geographical variations); 5) radiative heat exchange in atmosphere (relation to turbulent heat exchange, radiative balance, vertical temperature gradient). Working tables and nomograms are appended. (Same item as 3.4-5, April 1952, MAB.) *Subject Headings:* 1. Infrared radiation 2. Radiative transfer.—M.R.

11B-78

551.521.1(02):016

*†Kondrat'ev, K. Ia., *Luchistaia energiiia solntsa*. [Radiant energy of the sun.] Ed. by P. N. Tverskoĭ. Leningrad, Gidrometizdat., 1954. 599 p. 267 figs., 220 tables, 507 refs. **DLC** (QC912.K6)—The first part of this comprehensive book on solar radiation follows the lines of KALITIN's classic text of 1938, though incorporating findings through 1953. The last part of the book is completely original and based almost entirely on recent data and literature from Russia and abroad. The systematically arranged chapters cover: 1) General concepts of radiation; 2) Theory of actinometry of short (and visible) wave radiation in the atmosphere; 3) Extinction in atmosphere due to scattering; 4) Atmospheric extinction due to absorption; 5) General extinction, transmissivity, effects of clouds, geographical variation; 6) Spectral distribution of solar and transmitted energy; 7) Flux and total heat of direct solar radiation; 8) Reflected radiation; 9) Albedo of surface of earth and clouds; 10) Global radiation; 11) Insolation under special conditions (vegetation, forests, water, snow, ice); 12) Applications. The book is profusely illustrated with graphs and the text supported by selected tabular data, theory and extensive references on every subject (arranged by chapters). Although a good percent of the reference material is from foreign sources, the tables have mostly been given in Cyrillic (Russian). The subject index gives a good idea of the wide variety of instrumental, observational and theoretical subjects covered. (Same item as 8.5-8 and 8G-132, MAB.) *Subject Headings:* 1. Solar radiation textbooks 2. Solar radiation bibliographies 3. Albedo. I. Iani-shevskii, Iu. D. II. Tverskoĭ, P. N. (ed.).—M.R.

11B-79

551.521(02)

Kondrat'ev, K. Ia., *Luchistyĭ teploobmen v atmosfere*. [Radiant heat exchange in the atmosphere.] Ed. by P. N. Tverskoĭ. Leningrad, Gidrometizdat, 1956. 419 p. 105 figs., 71 tables, 390 refs., eqs. **DLC** (QC880.K63)—In 1950 the author published a monograph on *Perenos dlinnovolnovogo izlucheniia v atmosfere* (see 3.4-5 and 11B-77, MAB) and in 1954 one on *Luchistaia energiiia solntsa* (see 8.5-8 and 11B-78, MAB). The present text is a more exhaustive treatment of the problems of the thermal and radiation balance of the atmosphere and the earth's surface, by way of supplementing the material in the book on solar radiation. The general theory of black

body radiation and of radiation exchange is found in Ch. I. Successive chapters deal with: II. Actinometric measurement and analysis of data; III. Absorption of long wave radiation in the atmosphere and methods (including graphical) of calculation; IV. Calculation of radiant heat transfer in atmosphere; V. Calculation of radiant heat balance in the atmosphere; VI. Counter radiation as radiation from underlying surface; VII. Empirical results of studies of radiation balance of the active surface, methods and results of theoretical calculations; VIII. Actual calculation of temperature changes in the atmosphere from knowledge of radiation balance, turbulent transfer, etc. The book covers both theoretical aspects and practical problems such as radiation balance of oceans, lakes, glaciers, crops, snow cover, forests, soils, hotbeds, frost pockets, slopes, etc., and seasonal changes in radiation balance, and contains nomograms and tables for making calculations. An excellent up-to-date bibliography is also included. (Same item as 8.7-8, July 1959, MAB.) *Subject Headings*: 1. Radiation balance textbooks.—M.R.

11B-80

551.511(0)

Koschmieder, Harald Hans, *Dynamische Meteorologie*. [Dynamic meteorology.] 3rd ed. Leipzig, Geest & Portig, 1951. 404 p. diagrs., graphs, tables, bibliog. DWB—The fifth edition of KOSCHMIEDER's text came out in 1933, and along with the similar works of EXNER, BJERKNES et al. (*Physikalische Hydrodynamik*), and BRUNT, it became one of the classics in the field of dynamic meteorology. The second edition (1941) was greatly improved by including theoretical work of REFSDAL, NORMAND, ROBITZSCH, ROSSBY, JEFFREYS, PRANDTL, LYRA, LETTAU and others in the fields of thermodynamics, general circulation, wave motion, energy exchange and transport, turbulence, etc. This third edition is only slightly revised, containing some of the synoptic and aerological developments of such authors as SCHERHAG, RAETHJEN, SVERDRUP, HAURWITZ, PALMIER and ROSSBY. On p. 327-341 and 209-225 a very extensive treatment is given of the general and LYRA's special theory of vertical currents (for soaring, Moazagotl cloud formation, convective activity, etc.), with applications and schematic diagrams. The effect of mountain ranges on the flow of air, waves on a tropospheric inversion or on the tropopause, the Ekman spiral, Austausch, resonance in the atmosphere, föhn theory, cloud physics (change of state, energy changes, etc.) and many other practical problems are treated theoretically. All of the usual aspects of theoretical and practical dynamic meteorology (general circulation, gradient winds, adiabatic changes, evaluation of aerological soundings, frictional influences, etc.) are treated fully. (Same item as 3.7-6, July 1953, MAB.) *Subject Headings*: 1. Dynamic meteorology textbooks 2. Vertical motion theories.—M.R.

11B-81

551.58(02)(41)

*Kostin, S. I. and Pokrovskaja, T. V., *Klimatologija*. [Climatology.] Leningrad, Gidrometeoizdat., 1953. 426 p. 146 figs., 74 tables, 19 refs., eqs. DWB—This textbook on climatology, intended for those working in or intending to work in the Hydrometeorological Service of the U.S.S.R. presents in Pt. I the basic concepts and methods of climatology, the climate of the earth and of the U.S.S.R. (in more detail) from the point of view of the radiation, circulation and topographic surface cover influences and their effects. Microclimate, climatic changes and artificial influences on climate are also treated in this section. The second section is a unique presentation of methods of collecting, compiling and interpreting climatic data and data for the separate elements (radiation, heat and moisture balance, temperature, pressure, wind, cloudiness, sunshine, precipitation, snow cover, soil temperature, and various other atmospheric phenomena). Methods of charting drought, effective moisture, climatic anomalies, synoptic climatological factors and "complex" climatology (of FEDOROV) are illustrated. Agroclimatological (including phenological) methods are also described and illustrated. The latest statistical techniques for handling meteorological data, and the climatic classification schemes of L. S. BERG and of B. P. ALISOV and KÖPPEN are illustrated and discussed. (Same item as 5.11-5, Nov. 1954, MAB.) *Subject Headings*: 1. Climatology textbooks 2. Climatology of U.S.S.R. 3. U.S.S.R.—M.R.

11B-82

551.5:63(02)

Kostin, S. I., *Osnovy meteorologii i klimatologii*. [Fundamentals of meteorology and climatology.] 3rd ed. rev. and enl. Leningrad, Gidrometeoizdat., 1955. 393 p. 152 figs. (1 fold.), 11 tables, 24 refs. DLC—The 3rd edition of this text for students of agricultural meteorology has been somewhat revised, amplified and rearranged and includes about 20 more pages, a few more figures and tables and recent references. It consists of two main sections—one on processes of the weather and one on climatology and local climates of the Soviet Union. The role of solar radiation, soil temperature, evaporation, cloud physics and precipitation processes, frozen soil, influence of vegetation, shelter belts, snow cover, etc., and climatic zones, climatic conditions in various parts of the earth as well as the U.S.S.R. and climatic extremes are taken up systematically. (For abstract on 2d ed., pub. 1951, see 4.4-8, April 1953, MAB.) (Same item as 7.9-3, Sept. 1956, MAB.) *Subject Headings*: 1. Agrometeorological textbooks 2. Climate of U.S.S.R. 3. U.S.S.R.—M.R.

11B-83

551.588.7(02):016

†Kratzer, Albert, **Das Stadtklima**. [City climate.] 2d enl. ed. Brunswick, Vieweg, 1956. 184 p. 78 figs., tables, 563 refs. (*Die Wissenschaft*, Brunswick, Vol. 90.) **DWB** (M88.7 K89s), **DLC** (QC866.K7 1956). Review by F. Steinhäuser in *Archiv für Meteorologie, Geophysik und Bioklimatologie*, Ser. B., 8(1):131-132, 1957. Russian transl. as **Klimat goroda**, ed. by E. E. Mikhelevich. Moscow, 1958. 238 p. bibliog. p. 214-237.—Since the first edition (see 3G-170, July 1952, *MAB*) of this excellent little book came out in 1937, hundreds of articles have been published on various aspects of urban climatology, but no new books. Hence a complete and painstaking revision was necessary, and this has been accomplished by adding over 40 pages of text, 35 figures and over 300 references. The several chapters cover: I, city climate; II, history; III, the city; IV, city air; V, radiation; VI, temperature; VII, wind; VIII, humidity; and IX, precipitation. Besides the excellent bibliography of 563 references, there is a name (author and place) and a subject index. The literature is thoroughly reviewed and illustrative tables and graphs, maps and charts profusely scattered through each chapter or section of a chapter. Topographic, diurnal, weekly, monthly, and annual variations of meteorological elements; variations with height above sea level or valley; industrial effects; wind effects; effects of growth of cities, of pavements, buildings, pollution of various types; parks, railroads, organic matter; electrical (ion) variations; influence of surroundings; comfort, nuclei, etc., are discussed. Examples are taken from cities in all parts of the world—those used most frequently being Vienna, Paris, Berlin, Budapest, London, Munich and Nuremberg and those less often New York, Stockholm, Frankfurt, Hamburg, Leipzig, Cologne, Los Angeles, Lyons and Stuttgart. (*Same item* as 8.8-15, Aug. 1957, *MAB*.) *Subject Headings*: 1. Urban climatology textbooks 2. Bibliography on urban climates 3. Urban influences. I. Mikhelevich, E. E. (*transl.*).—*M.R.*

11B-84

551.5:656.61(02) 551.46(02)

§Krauss, Joseph and Stein, Walter, **Wetter- und Meereskunde für Seefahrer**. [Meteorology and oceanography for mariners.] 4th ed. Berlin, Springer-Verlag, 1958. 206 p. 102 figs., cloud photos (fold. in pocket), tables, bibliog. p. 166. Price: DM 19.50. **DWB**, **DLC**. Review by B. F. Bulmer in *Institute of Navigation, Journal*, 12(2):219-220, April 1959. First edition issued by Krauss in 1917 under title **Grundzüge der maritimen Meteorologie und Ozeanographie**. 2d ed. (with Prof. Meldau) appeared 1931. 3d ed. (with Stein), 1952. (For abstract, see 5A-55, Jan. 1954, *MAB*).—The 1952 (3rd) edition of this practical textbook for mariners and navigators is further revised to include about 35 pages of new material on radar hurricane location, facsimile weather charts, synoptic reporting and storm tide warning services, use of upper level charts and knowledge of the jet stream and meteorological navigation. The general approach is not for meteorologists but to serve as a manual for reference or study on: 1. General meteorology; weather and observations; 2. Meteorological laws; 3. Basic laws controlling weather; 4. Winds and wind systems; 5. Extratropical storms; 6. Waterspouts and hurricanes; 7. Physical oceanography, waves, currents, etc.; 8. Weather networks and services for mariners; 9. Plotting weather maps on shipboard; 10. Forecasting on shipboard; 11. Navigation and ice navigation. Appendices give wind scales and tables for calculating humidity, cloud heights, etc., and charts of clouds (in color) and ocean currents. (*Same item* as 10.6-10, June 1959, *MAB*.) *Subject Headings*: 1. Marine meteorology textbooks 2. Oceanography textbooks 3. Meteorological navigation. I. Meldau, H.—*M.R.*

11B-85

551.509(02) 551.509.33

Krichak, O. G., **Sinopticheskaya meteorologiya**. [Synoptic meteorology.] Leningrad, Gidrometeoizdat, 1956. 530 p. 295 figs., 12 tables.—A standard, up-to-date textbook for students of synoptic meteorology for practical use in courses in synoptic analyses and forecasting or aerological research and analysis. The 16 chapters cover organization, history and development of synoptic service in U.S.S.R., including: 1) synoptic charts, 2) pressure (baric and isalobaric) fields, 3) air motions (wind), 4) convection, vertical motion, 5) charts of baric topography, 6) condensation, 7) general circulation, 8) air masses, 9) fronts, 10) pressure changes, 11) cyclones, 12) anticyclones, 13) cyclonic and anticyclonic activity (including tropopause changes), 14) short range and special forecasting, 15) long range forecasting. Covered under short range or special forecasting are: Par. 129) cloud forecasting, 130) cloud top forecasting, 132) general precipitation, 133) shower and thunderstorm forecasting, 134) wind, 135) temperature, 136) frost, 137) fog, 138) snowstorm or blizzard, 139) visibility, 140) glaze and ice, 141) single station forecasting. The long range and 3-day forecasting techniques are based entirely on the composite chart—natural synoptic period circulation type school of **MULTANOVSKIĬ**. The text is full of illustrative charts, cross sections, schematic diagrams, models, air mass or storm track charts, Northern Hemisphere mean charts, adiabatic diagrams (soundings), tables, nomograms, code specifications, etc., and synoptic case histories or examples for eastern Europe or Eurasia. A good subject index is also included. (*Same item* as 8.8-16, Aug. 1957, *MAB*.) *Subject Headings*: 1. Synoptic meteorology textbooks 2. Specialized forecasting techniques 3. Long range forecasting techniques.—*M.R.*

11B-86

551.511(02)

*†Laikhtman, D. L. and Iudin, M. I. (eds.), *Osnovy dinamicheskoi meteorologii*. [Principles of dynamic meteorology.] Leningrad, Gidromet. Izdat. 1955. 646 p. 144 figs. (some fold.), 42 tables, 65 refs., eqs. **DLC** (QC861.L26)—This textbook of dynamic meteorology is based upon courses taught at the University of Leningrad and at the Leningrad Hydrometeorological Institute. It is a comprehensive mathematical treatment (using differential equations rather than vector analysis) of the entire field of dynamic meteorology. The book is divided into 5 parts and 18 chapters: fundamental equations of the dynamics of the atmosphere, analysis and simplification of the equations of dynamics of the atmosphere, thermodynamics of a dry atmosphere, and in saturated air, thermal convection in the atmosphere, radiation energy in the atmosphere, statics of the atmosphere, wind in the free atmosphere, aperiodic variations of pressure and temperature, temporal variation of pressure under the influence of dynamic factors, surface boundary and waves in the atmosphere, distribution of the meteorological elements in the surface layer of the atmosphere, energetics of the atmosphere and structure of meteorological fields, local circulations in the atmosphere, temperature regime of the atmosphere and general circulation of the atmosphere. (*Same item* as 8.7-9 and 9.3-7, *MAB*.) *Subject Headings: 1. Dynamic meteorology textbooks. I. Gandin, Lev Semenovich II. Matveev, L. T.—I.L.D.*

11B-87

551.58(02)

*†Landsberg, Helmut (*Dir., Office of Climatology, U. S. W. B.*), *Physical climatology*. 2d ed. DuBois, Pa., Gray Printing Co., 1958. 446 p. 109 figs., 224 tables, bibliog. at end of each ch. Price: \$6.00. **DWB**—This second edition of a popular college textbook, first issued in 1941, has been completely revised and rewritten to take into consideration advances in climatology made during two very active decades in this branch of meteorology. The present edition contains a vast quantity of information for an elementary college text, and aside from its thorough and systematic coverage of every aspect of "pure" and applied climatology, it has scores of illustrative figures and tables, excellent lists of up-to-date and well chosen references, an author and a subject index. The 55 sections are divided among 10 major sections under the four main chapters: 1) Collection and use of climatic data (methods, observations, instruments, stations and networks); 2) Climatological elements (atmospheric heat balance, simple elements and complex elements); 3) Combinations of elements (world climate, regional climate, local climate, spot climate and climate control); and 4) Applied climatology (geographic systems, biological and agricultural relations and technoclimatology, and climatological aids to forecasting, space relation, trends and fluctuations). (*Same item* as 10.5-14, May 1959, *MAB*.) *Subject Headings: 1. Climatology textbooks 2. Physical climatology 3. Applied climatology.—M.R.*

11B-88

551.579:551.49(02)

§Leivikov, Moisei L'vovich, *Meteorologiya, gidrologiya i gidrometriya*. [Meteorology, hydrology and hydrometry.] 2d rev. ed. Moscow, Gos.Izd-vo Sel'khoz. Lit-ry, 1955. 510 p. 213 figs. (some fold.), 46 tables, 21 refs., 165 eqs. **DLC**—This second edition of the author's text (for use in hydrology courses for agricultural and hydrological engineers) contains about 40 pages more material and 60 more illustrations (and a few bibliographic references) than were found in the first edition (1949) (*see* 2.6-113, June 1951, *MAB*). Corrections and amplifications are distributed throughout the book. The main emphasis is on instruments, observations and measurements on various small and large basins of the U.S.S.R., and in the quantitative forecasting of streamflow, water supply and floods. There is a 40-page chapter on lakes, ponds and bogs, their hydrology and water economy. The material on meteorology and forecasting weather is brief and conventional. The section on evaporation, however, is quite thorough. Numerous charts show the runoff and other hydrometeorological factors (evaporation, snow cover, precipitation, etc.), both annual and seasonal, in European U.S.S.R. and in the whole Union. (*Same item* as 8.5-9, May 1957, *MAB*.) *Subject Headings: 1. Hydrometeorology 2. Hydrology textbooks 3. U.S.S.R.—M.R.*

11B-89

551.579(02)

†Linsley, Ray K., Jr., Kohler, Max A. and Paulhus, Joseph L. H., *Applied hydrology*. New York, McGraw-Hill, 1949. 689 p. figs., charts, tables, refs. in foot-notes, append., bibliog. p. 662-663. **DWB**—The book is intended for practicing and student hydrologists and hydrologic engineers, including between one set of covers much material otherwise available only in periodical literature or in reports of limited circulation. Its prime purpose is to present, after development from basic principles, the latest methods for the forecasting of streamflow and water supply. It includes a short summary of basic theoretical meteorology for hydrologists but is stress on data and practices common to both fields makes it of interest to meteorologists. It contains an unusual collection of maximum observed rainfall intensities, both point and areal, and also estimates of "maximum possible" precipitation for areas from 10 to 500 sq mi. Detailed instructions (as developed by the Corps of Engineers) are given for the time-area-depth analysis of storm rainfall. The theory and

practice of the "hydrometeorological" extrapolation of observed storm rainfall to maximum possible estimates for design purposes are discussed, as are the uses and theories of intensity-frequency analysis of floods and rainfalls. Double-mass-curve and graphical-multiple correlation methods of analysis of rainfall-runoff relations are illustrated with examples from actual practice. The relations between type of storm rainfall, basin character, and shape of hydrograph are examined in great detail and illustrated. There is much material, both theoretical and empirical, on the physics and computation of snow melt and evaporation. The citation of references is thorough and an appendix listing the sources of hydrologic and meteorological data is included. (*Same item as 3-113, March 1950, MAB.*) *Subject Headings: 1. Hydrology textbooks 2. Hydrometeorology.*—A. L. Shands.

11B-90

551.579(02):62

†Linsley, Ray K., Jr., Kohler, Max A. and Paulhus, J. L. H., **Hydrology for engineers.** N. Y., McGraw-Hill, 1958. 340 p. numerous figs., tables and foot-refs. DWB (M79 L759hy), DLC (GB661.L53)—The 1949 textbook written by the same authors (*Applied hydrology, see 11B-89, MAB*) was much larger and more technical than this new work which is intended as an elementary text for engineering students, with a minimum of theory and a maximum amount of quantitative illustrative material in tables and graphs. The general outline, however, is similar to that of the 1949 text: 1) Hydrologic cycle, etc., 2) Weather, 3) Precipitation, 4) Stream flow, 5) Evaporation, 6) Ground water, 7) Hydrographs, 8) Runoff, 9) Runoff hydrographs, 10) Stream flow routing, 11) Duration frequency analysis, 12) Sedimentation, 13) Hydrologic applications; also two appendices covering: A—Graphical correlation and B—Constants, tables, etc. Finally, there is a good name and subject index. (*Same item as 10.8-9, Aug. 1959, MAB.*) *Subject Headings: 1. Hydrology textbooks 2. Engineering hydrology.*—M.R.

11B-91

551.501.81:551.576.11:551.574.1(02)

*†Mason, Basil John, **Physics of clouds.** *Oxford Monographs on Meteorology*, ed. by P. A. Sheppard, Vol. 1, published London, Oxford Univ. Press, 1957. 481 p. 165 figs. (incl. 39 half-tone plates), bibliog. p. 446-470. Price: 70 sh. DLC (QC921.5.M3)—A most substantial and satisfactory text on the various aspects of the rapidly growing subject of cloud physics and artificial cloud modification. It summarizes the knowledge contained in over 600 articles by the many prolific writers in this field, and includes beautiful photos, graphs, charts, nomograms and tables from the best and most recent sources. The bibliography by the author is extremely thorough. Chapters include: Introduction: Macro-physics of clouds; 1) Condensation in clean air; 2) Condensation nuclei; 3) Cloud and fog drop growth; 4) Ice forming nuclei; 5) Snow crystal formation; 6) Precipitation physics; 7) Artificial precip. stimulation; 8) Radar cloud and precip. studies; Appendix A) Collision efficiency of drops; B) Physical properties of falling drops. (*Same item as 9.6-3, June 1958, MAB.*) *Subject Headings: 1. Cloud physics textbooks 2. Artificial precipitation 3. Radar cloud physics studies 4. Bibliography on cloud physics. I. Sheppard, P. A. (ed.).*—M.R.

11B-92

551.510.53(02)

Massey, Harrie Stewart Wilson and Boyd, R. L. F., **The upper atmosphere.** London, Hutchinson and Co., 1958. 333 p. 12 figs., 21 plates, 6 tables, 20 refs., 33 eqs. Price: 63 sh. DLC (QC879.M3). Review by D. R. Bates in *Nature*, 182(4650):1629, Dec. 13, 1958.—This is the latest and most systematic book summarizing the current knowledge of the upper atmosphere (from 10 mi to several hundred mi above the surface) as gained by study of geomagnetic fields, radio wave propagation, spectra, radiations; by means of balloons, rockets, explosive waves, radio, spectroscopes, magnetometers, meteor photographs and spectra, cosmic ray counters or chambers, artificial satellites and other direct and indirect methods. Upper air temperature, composition, density; ionization, cosmic radiation (U V, visible, cosmic ray and radio frequency), magnetic fields and electric currents, auroral and air glow phenomena, ozone changes, twilight flashes and glows, atmospheric tides, solar corpuscular streams and other elements observed are tabulated. (*Same item as 10.8-6, Aug. 1959, MAB.*) *Subject Headings: 1. Upper atmosphere textbooks 2. Upper atmosphere physics.*—M.R.

11B-93

551.510.42(02)

†Meetham, Alfred Roger, **Atmospheric pollution: its origins and prevention.** 2d rev. ed. London, Pergamon Press, 1956. 302 p. 82 figs., 28 tables, bibliog. at end of each ch., general bibliog. p. 291-297 (92 refs.). DWB (M10.42 M495a 1956), DLC (RA576.M4 1956)—This book presents information on measurement, distribution and effects of atmospheric pollution by smoke, gases and offensive particles, fuels, fuel-burning appliances, industrial processes and domestic fires. Then follows a study of the properties of atmospheric pollution under the headings: smoke, ash, sulphur dioxide, etc., and the various methods of measuring each of these components. The distribution of atmospheric pollution and its components is discussed and mapped for Britain as a whole and for typical towns, open spaces, etc. The yearly, weekly and daily cycles are summarized, including irregular variations due to weather. Effects of pollution on health, corrosion, light, etc. are briefly

examined. The total loss in Britain is estimated as 100 million pounds a year. Finally, methods of preventing or minimizing pollution are discussed and the laws against pollution set out. A new chapter (p. 265-290) on **Recent developments** has been added in the 2d ed., in which investigations and data from the Great London smog of Dec. 1952 (4000 died), the Donora (1948) and other recent disasters, and data from routine industrial or municipal studies, precautions advised, trends in Britain, pollution from petroleum combustion and nuclear reactors are presented, and a long bibliography of recent articles, arranged by subjects is appended. (*Same item as 9.3-5, March 1958, MAB.*) (For abstract on 1952 ed., see 4.2-12, Feb. 1953, *MAB.*) *Subject Headings: 1. Atmospheric pollution textbooks 2. Smoke abatement.—C.E.P.B. and M.R.*

11B-94

551.591:016(02)

†Middleton, William E. K. (*Natl. Research Council Labs., Ottawa, Canada*). **Vision through the atmosphere.** Toronto, Univ. of Toronto Press, 1952. 250 p. numerous figs., tables, eqs., 420 refs. in bibliog. p. 231-246. **DWB**—Even though this book is full of theory, it is presented very clearly, and hints at applications in many fields (e.g., aviation, meteorological observation, forest fire detection, photography, naval operations, etc.) are not wanting. The emphasis is on the physical and psychological aspects of vision, as determined from scores of studies made in the past 15 or 20 yrs, and there has been a complete elimination of material on the climatological and synoptic relationships which played a prominent part in the earlier text entitled **Visibility in meteorology** (see 31-88). Ch. I defines the problem and gives a brief history of methods of estimation of visual range. Elementary photometric theory (concepts, units and coefficients) occupies the second chapter. Ch. III summarizes our knowledge of the extinction or scattering of light by the atmosphere. Ch. IV tells how the atmosphere alters the contrast and otherwise affects the horizontal, vertical or slant visibility of distant objects (KOSCHMIEDER's and other theories are explained and illustrated). Ch. V explains the function of the eye in vision (contrast thresholds, color vision, etc.). Ch. VI and VII tell how to use this knowledge to calculate the visual range of objects (of different sizes and shapes) against various backgrounds, or by means of telescopes and cameras in daylight and of lights (searchlights or artificially illuminated objects) by night. Many elaborate nomograms are included in these chapters for calculating visual range of objects or lights against the sky or on the ground, and of forest fire smoke. Ch. VIII deals with color and visibility of distant objects and Ch. IX, with various instruments for measuring extinction, scattering or visual range. These (photometers, nephelometers, or visibility meters) are carefully described and illustrated. Ch. X takes up practical problems of visual range measurement by meteorologists, pointing out that the failure of meteorologists to use the many excellent measuring devices stems from the complete lack of agreement on a definition of "visibility." An attempt is made to rationally relate contrast threshold to visibility observation at airports (scales of visibility are given). Finally, in Ch. XI the substance of the theory, the problem facing the science and future studies which might be made, are reviewed. (*Same item as 4.4-11, April 1953, MAB.*) *Subject Headings: 1. Visibility textbooks 2. Visibility bibliographies.—M.R.*

11B-95

551.508:551.501(02)

†Middleton, W. E. Knowles and Spilhaus, Athelstan F., **Meteorological instruments.** 3rd rev. ed. Toronto, Univ. of Toronto Press, 1953. 286 p. 192 figs., numerous refs. **DWB**—The first edition of MIDDLETON's text on meteorological instruments appeared in Sept. 1941. Revisions, reprints or new editions came out in June and Nov. 1942, Jan. and May 1943, and in Feb. 1947. This (3rd) edition contains a great deal of new material, including radar observations of meteorological elements or electronic wind and spherics equipment, constant level balloon techniques, airplane reconnaissance, mobile stations, automatic weather stations, radio wave sounding and other new equipment or methods are given due attention. The general structure of the book remains simple: I. General properties of meteorological instruments, II. Pressure measurement, III. Temperature, IV. Humidity, V. Precipitation and evaporation, VI. Surface wind, VII. Upper air wind, VIII. Clouds and radiosondes, IX. Composite instruments and X. Sunshine. (*Same item as 5.10-6, Oct. 1954, MAB.*) *Subject Headings: 1. Meteorological instrument textbooks 2. Observation techniques.—M.R.*

11B-96

551.58(02)

†Miller, Arthur Austin (*Univ. of Reading*), **Climatology.** "8th ed. rev. and reset." London, Methuen, 1953. 318 p. 80 figs., tables, bibliog. at end of each ch. **DWB** (M8 M647c 1953)—A textbook treatment of climatology from the point of view of climatic types rather than geographical regions. The environment of each type is treated in general (normal conditions) and then local peculiarities are pointed out. The purpose of the book is to give geography students the rudiments of meteorology and its synthesis and relationship to human activity and the earth's landscape. If the student wishes to go deeper, he can consult the references at the end of each chapter. Ch. I defines climatology, II, the elements of climate, III, the factors of climate, IV, air masses, V, classification of climate, VI, equatorial climatology, VII, tropical climates, VIII, monsoon, IX, western

margin warm temperatures, X, eastern margin warm temperatures, XI, cool temperature climates, XII, cold, XIII, Arctic, XIV, desert, XV, mountain and XVI, change in climate. This eighth edition contains only minor changes compared with the third (1944) edition and only a few changes over the 1st (1939) edition. If one searches carefully he will find half a dozen references to post-1930 literature, but that is natural since this is essentially a "classical textbook with a classical approach to a classical concept of climatology." (For abstract on 3d ed., see 6-83, 7th ed., 4.8-216, MAB.) *Subject Heading: 1. Climatology textbooks.*—M.R.

11B-97

551.511.32:532.5(02)

Milne-Thomson, Louis M., *Theoretical hydrodynamics*. 3d ed. London, Macmillan, 1955. 632 p. numerous figs. and eqs. DLC (QA911.M5 1955)—This classical textbook, which began as a series of lectures to the Royal Corps of Naval Constructors at Greenwich, has been revised and enlarged over the 1950 (see 8-37, Aug. 1950, MAB) edition by 32 pages. The book presents a rational and thorough treatment of the mathematical theory of fluid motion as applicable to hydrodynamics and aerodynamics and, incidentally, to meteorology and oceanography. The exclusive use of vector methods throughout does not mean that a knowledge of higher mathematics (beyond calculus) is necessary to follow the developments. Beginning with the theorems of BERNOULLI, STOKES, GAUSS and Green, the author plunges right into the basic concepts of dynamic meteorology. The equations of motion or continuity, pressure, energy, vorticity, two-dimensional motion, complex variables (La Place), streamlines, sources and sinks, jets and currents, Helmholtz motions, stationary waves, long waves, tides, surface waves, stream functions, vortex motion, viscosity, thermodynamics, etc. are treated in detail. (Same item as 9.4-7, April 1958, MAB.) *Subject Heading: 1. Hydrodynamics textbooks.*—M.R.

11B-98

551.593.5/6:551.521.16(02) (492)

Minnaert, Marcellus, *Licht en kleur in het landschap*. [Light and color in the open air.] 4th ed. Zutphen, W. J. Thieme, 1949. 385 p. 177 figs., 16 plates, foot-refs. throughout. (Vol. 1 of his *De Natuurkunde van 't Vrije Veld*.) DWB, DLC (QC975.M55). Transl. into English by H. M. Kremer-Priest, rev. by K. E. Brian Jay, with title *Nature of light and colour in the open air*. Issued N. Y., Dover Publications, 1954. 362 p. DLC (QC975.M552 1954). Review by W. E. K. Middleton in *Optical Society of America, Journal*, 44(10):820, Oct. 1954. (Note: there was an earlier 1940 transl. by same translator and editor, with title *Light and colour in the open air*, issued London, C. Bell.) DLC (QC975.M552)—This is the fourth and completely revised edition of a fascinating and comprehensive book dealing with all manner of optical phenomena in nature (atmospheric and astronomical), with scores of diagrams and photographs illustrating the artistic as well as the physical or optical aspects or principles involved. The problem of light, shadow and color is first discussed on the basis of the refraction or scattering of solar (or star) radiations. Measurement of light intensity or brightness, characteristics of the human eye, color, contrast, effect of form and motion of subject or object, rainbows, halos, coronas, and other atmospheric optical phenomenon, illumination and color of sky, water, or other objects (albedo), and finally, luminescent plants, animals and minerals, are given special treatment in separate chapters. (Same item as 4.5-223, May 1953, MAB.) *Subject Headings: 1. Atmospheric optics textbooks 2. Illumination intensity 3. Color visibility 4. Dutch language textbooks. I. Kremer-Priest, H. M. (transl.) II. Jay, K. E. Brian (ed.).*—M.R.

11B-99

551.511(02):533.15. 534

†Mises, Richard von (1883-1953), *Mathematical theory of compressible fluid flow*. Completed by Hilda Geiringer and G. S. S. Ludford. N. Y., Academic Press, 1958. 514 p. 175 figs., 6 tables, bibliog. p. 502-503, eqs. Notes and addenda, p. 464-501, contain many bibliog. refs. (*Applied Mathematics and Mechanics*, Vol. 3.) DWB (533.6 M678ma), DLC (QA930.M57)—A thorough theoretical and practical textbook on fluid flow as applied to aerodynamics: 1) basic equations, 2) energy equation, Bernoulli equation, 3) viscosity and conduction, 4) acoustics and the wave equation, 5) subsonic and supersonic motion, Mach numbers, 6) general vortex theory of HELMHOLTZ and KELVIN, 7) irrotational motion, 8) steady flow, 9) theory of characteristics, 10) characteristics in case of two independent variables, 11) steady flow with viscosity and heat conduction, 12) non-steady flow of an ideal fluid, 13) simple waves; theory of: 14-15) shock phenomena and plane steady potential flow, 16) basic relations, 17) hodograph method, 18) simple waves, 19) limit lines and branch lines; 20) Chaplygina's hodograph method; integration theory and shocks, 21) development of Chaplygina's theory, 22) shock theory, 23) examples of shocks, 24) nonisotropic flow and 25) transonic flow. Author and subject indexes are provided. (Same item as 10.9-8, Sept. 1959, MAB.) *Subject Headings: 1. Fluid flow textbooks 2. Aerodynamics theory 3. Turbulence theory 4. Acoustical theory I. Geiringer, Hilda II. Ludford, G. S. S.*—M.R.

11B-100

551.510.53(02)

*†Mitra, Sisir Kumar (Prof. Physics, Calcutta Univ.), *The upper atmosphere*. 2d ed. Calcutta, The Asiatic Society, 1952. 713 p. figs., tables, bibliog. p. 644-668, eqs. (*Asiatic Society, Mono-*

graph Series, Vol. 5.) **DLC** (QC879.M49 1952). Transl. into Russian by G. V. Rozenberg and E. A. Makarov. ed. by V. I. Krasovskii and Ia. L. Al'pert, with title *Verkhnaia atmosfera*. Issued Moscow, Izdat. Inostrannoi Literatury, 1955. 639 p. 302 figs., 37 tables, bibliog. p. 590-609, eqs. **DLC** (QC879.M497). Review on English 2d ed. in *Royal Meteorological Society, Quarterly Journal*, 79 (342):571-572, Oct. 1953. Review on Russian transl. by A. Kh. Khrgian in *Meteorologiya i Gidrologiia*, Leningrad, No. 10:64-67, Oct. 1956. (For abstract on first English ed., see 1-57; 2d ed., see 4.8-15 and 11A-13. Russian transl., see 9.7-17, *MAB*)—This is the most satisfactory existing text or reference work on the upper atmosphere in all of its facets: pressure, density, escape of gases, atmospheric tides, winds, pressure oscillations, temperature distribution, anomalous sound propagation and soundings, meteoric phenomena and radar echoes from meteors, ozone layer, oxygen, ionosphere, ionospheric sounding, magnetic variations, auroras, magnetic storms and auroras (theory), airglow, twilight phenomena, spectroscopy, rocket exploration, and unsolved problems, etc. A good author and subject index are included. An extensive list of over 1000 references arranged by chapters, gives an essentially subject-arranged bibliography on the upper atmosphere. The Russian edition is a nicely bound and well edited translation of the 2d English edition. *Subject Headings*: I. Upper atmosphere physics textbooks 2. Atmospheric physics. I. Rozenberg, G. V. (transl.) II. Makarov, E. A. (transl.).—*M.R.*

11B-101

551.5:63(02)

*†Molga, Marian, *Meteorologia rolnicza*. [Agricultural meteorology.] Leśne, Warsaw, Państwowe Wydawnictwo Rolnicze, 1958. 572 p. 244 figs., 132 tables, bibliog. p. 560-565, eqs.—The second part of this work includes a well developed outline of agrometeorology. This work constitutes one of the infrequent textbooks which deals with the various agrometeorological problems in a logical and appropriate manner. The 8 chapters include: 1) Meteorological conditions of the layer of air close to the ground, 2) Climate of soil, 3) Information on ecoclimate, 4) Influence of meteorological elements on organism of plants, 5) Phenology, 6) Improvement of plant community conditions, 7) Agrometeorological service and 8) Working methods in agrometeorology. (*Same item as 10.11-8, Nov. 1959, MAB.*) *Subject Heading*: 1. Agrometeorological textbooks.—*A.V.*

11B-102

551.5(02)

*†Neuberger, Hans Hermann, *Introduction to physical meteorology*. State College, Pa., 1951. 271 p. diagrs., photos, tables, graphs, refs. **DLC**—Several phases of physical meteorology which are not usually covered in textbooks are treated thoroughly in this text. The omission of the entire field of dynamic meteorology does not detract from the value of the work since it is the subject of so many textbooks already in common use. The six major parts comprise: 1) condensation (cloud physics, icing, aerosols, etc.); 2) visibility (physiological factors, attenuation, daytime, nighttime and slant visibility); 3) radiation (solar, terrestrial, scattered, heat balance); 4) acoustics (Doppler effect, propagation in troposphere and stratosphere); 5) optics and 6) atmospheric electricity (ionization, lightning, aurora, sferics and radar in meteorology). The 6 appendices contain constants, conversion tables and equations for calculations in the several fields covered in the above chapters. Each chapter also contains numerous tables, graphs and nomograms as well as an ample list of references on works in that field (mostly to works in English and German). The text was compiled from the notes which the author used in his course at Pennsylvania State College, but is intended for use in extension courses for government meteorologists as well as in courses on the campus. (*Same item as 3.4-8; 3I-254, MAB.*) *Subject Headings*: 1. Physical meteorology textbooks. I. Pennsylvania State College, School of Mineral Industries.—*M.R.*

11B-103

551.510.535:551.507.362.1(02):016

†Newell, Homer E., Jr. (*Naval Research Lab., Wash., D. C.*), *High altitude rocket research*. N. Y., Academic Press, 1953. 298 p. 93 figs., 37 tables, numerous refs. at end of each chap. Price: \$7.50. **DLC**—A thoroughly readable but technical book. The first chapter discusses the upper atmosphere in general, the use of various types of rockets in present day investigations, and a tabulation of rocket flights made from March 1946 to Dec. 1952 and the essential facts about these flights. Ch. II takes up the rocket itself as a research tool (performance, pay load, motions, heating, and a schedule of preparations for firing). Ch. III gives results of experience in recovery of data (both by telemetering or usual means and from recovered instruments, records or photographs). Ch. IV gives theory and practice of determining pressure, density and temperature in the upper atmosphere and the latest data (either measured or derived) and models obtained therefrom. Ch. V gives a brief account of sound grenade or rocket measurements of winds at great altitudes. Ch. VI is a summary or description of equipment, methods and data on solar radiation obtained by rocket spectrographs. Ch. VII takes up spectrographic and photoelectric determinations of ozone and the effects of ozone on the atmospheric and solar radiation. Dissociation and diffusive separation of O₃ are important aspects discussed. Ch. VIII is on the ionosphere and the earth's magnetic field; Ch. IX on cosmic rays and their measurement, intensity, distribution with height and latitude, etc.

The final chapter gives a summary of methods and results of high altitude photography from rockets. Accuracy of equipment and methods used and possible sources of error are emphasized throughout the book. Only published results and data have been used. A subject and author index add to the usefulness of the book. (*Same item as 5.5-7, May 1954, MAB.*) *Subject Headings: 1. Rocket investigations 2. Upper air research textbooks 3. Rocket bibliographies.*—M.R.

11B-104

551.507.362.1

†Newell, Homer E., Jr.; Cox, R. B.; Dorling, E. et al., **Sounding rockets**. N. Y., McGraw-Hill, 1959. 334 p. numerous figs. (incl. photos) and tables, refs. at end of each ch., eqs. Price: \$12.50. (*McGraw-Hill Series in Missile and Space Technology.*) **DLC** (TL785.8.S6N4), **DWB** (M07.362 N545so)—A well illustrated, high-quality book giving the latest information and data on most of the sounding rockets in use in the U. S., U. K., France and Japan. (For fuller abstract, see 11.1-14, Jan. 1960, *MAB.*) *Subject Headings: 1. Sounding rockets 2. Satellite observatories 3. Military rockets. I. Van Allen, J. A. II. Singer, S. F. III. Townsend, J. W. IV. Masterson, J. E.*—M.R.

11B-105

551.463:534(02)

†Officer, Charles B. (*Rice Inst. and Woods Hole Oceanog. Inst.*), **Introduction to the theory of sound transmission with application to the ocean**. N. Y., McGraw-Hill, 1958. 284 p. numerous figs. and eqs., refs. at end of each ch. General bibliog. p. 279. (*McGraw-Hill Series in the Geological Sciences.*) **DLC** (QC233.O4)—An advanced undergraduate text on the theory of sound waves and their transmission, especially through water. Theory is illustrated by geometrical diagrams, cross sections or curves, as well as by hundreds of equations. (For fuller abstract, see 11.1-18, Jan. 1960.) *Subject Headings: 1. Submarine acoustics 2. Acoustical propagation textbooks 3. Oceanographic acoustics.*—M.R.

11B-106

551.5(02)

Okada, Takematsu, **Kisho-gaku-tsuron**. [General meteorology.] Tokyo, Iwanami Book Co., Ltd., 1949. 259 p. 97 figs., foot-refs., numerous eqs. In Japanese. **DLC** (Orientalia)—The most popular meteorological textbook in Japan for beginning courses in the university. Classical treatment. This is a new edition of the author's **Kisho-gaku-kowa** [Popular treatise on meteorology], (pub. Tokyo, Iwanami Book Co., Ltd., 1928. 329 p. 88 figs., tables and plates). The 28 chapters are entitled: 1) Atmosphere, 2) Temperature, 3) Barometric pressure, 4) Humidity, 5) Evaporation and condensation, 6) Thaw and dew, 7) Fog, 8) Cloud, 9) Rain, 10) Snow, 11) Ice, 12) Hail, 13) Rain-fall, 14) Sunshine and cloudiness, 15) Solar radiation, 16) Wind, 17) Large scale wind system, 18) Local wind system, 19) Watersput and thunderstorm, 20) Anticyclone, 21) Cyclone, 22) Tropical cyclone, 23) Air-mass and front, 24) Optical phenomena, 25) Atmospheric electricity, 26) Atmospheric acoustics, 27) Aerology, 28) Weather forecasting. (*Same item as 8.7-10, July 1957, MAB.*) *Subject Headings: 1. Meteorology textbooks 2. Japanese language textbooks.*—H. Arakawa.

11B-107

551.511(02)

Panofsky, Hans A., **Introduction to dynamic meteorology**. University Park, Mineral Industries Extension Services, College of Mineral Industries, Pennsylvania State Univ., 1956. 243 p. 59 figs., 251 eqs. **DLC**—This is a condensed text on the principles of modern dynamic meteorology for the practicing forecaster or the upper class college student. The first chapter reviews the basic mathematical aspects (calculus, vectors, etc. applied to geopotential, isentropic, streamline, trajectory, divergence, circulation and vorticity problems). Ch. 2 takes up the fundamental physical laws used in meteorology (ideal gas law, equations of motion, continuity, moisture and thermodynamics). Ch. 3 goes into relation between thickness, temperature and wind field, stability changes, vorticity and pressure tendency equations; Ch. 4, wave theory (perturbations); Ch. 5, dynamic forecasting and examples used in numerical prediction; Ch. 6, turbulence, evaporation, etc. and Ch. 7, theories of general circulation. Some of the derivations are given in appendix. Each chapter has a summary in nonmathematical and one in mathematical terms and a few references. (*Same item as 7.11-10, Nov. 1956, MAB.*) *Subject Heading: 1. Dynamic meteorology textbooks.*—M.R.

11B-108

551.5:519.2(02)

Panofsky, Hans A. (*Pa. State Univ.*) and Brier, Glenn W. (*U. S. W. B., Wash., D. C.*), **Some applications of statistics to meteorology**. University Park, Pa., College of Mineral Industries, The Pennsylvania State Univ., 1958. 224 p. 21 figs., 45 tables, refs., eqs. **DWB, DLC** (QC874.P3)—A series of lecture notes used in a course in meteorological statistics at Penn. State Univ. prepared by PANOFSKY has been revised and supplemented by BRIER and further supplemented by J. LEITH HOLLOWAY (Smoothing and filtering) and H. D. S. THOM (Transformation of frequency distribution). ROGER ALLEN was co-author of the chapter on Forecast verification. The main chapters are: 1) Frequency distributions; 2) Theoretical frequency distribution; 3) Sampling theory; 4) Analysis of relationship between 2 variates; 5) Between more than 2 variates; 6) Time series; 7) Space varia-

tion of meteorological variables, 8) Statistical weather forecasting and 9) Forecast verification. A very thorough subject and author index is provided. Although a number of modern applications (such as the Incomplete Gamma Function) to meteorology are incorporated, the text does not presuppose any previous knowledge of statistics, but is intended for advanced students of meteorology with a good mathematical training. (*Same item as 9.6-4, June 1958, MAB.*) *Subject Headings:* 1. Statistics in meteorology 2. Meteorological statistics textbooks 3. Statistical forecasting 4. Forecast verification.—*M.R.*

11B-109

551.508.71(02)

†Penman, Howard Latimer, **Humidity**. London, Institute of Physics, 1955. 71 p. 19 figs., 6 tables, 22 refs., 7 eqs. (*The Institute of Physics, Monographs for students.*) Price: 5 sh. Reviewed by Malcolm Rigby in *Weatherwise*, Boston, 9(3):100, June 1956. DWB—The various methods of measuring humidity are reviewed in this pocket size book for the benefit of students and workers in agricultural meteorology and related fields. The properties of water vapor; principles of vapor balance over water or a salt solution; basic method of hygrometry (gravimetric and volumetric); the dew point and frost point hygrometer; wet and dry bulb hygrometer; thermocouples; thermistors; use of hygroscopic materials (hair, gold-beater's skin, cone-fibers); electrolytic hygrometers; thermal paper, sulfuric acid, cobalt salt papers, diffusion, anodized aluminum, dielectric and solid hygroscopic salt hygrometers are discussed, illustrated and their numerical characteristics are tabulated. Finally, industrial hygrometry and humidity control (air-conditioning) are treated. (*Same item as 7.9-7, Sept. 1956, MAB.*) *Subject Headings:* 1. Humidity instruments 2. Humidity measurement textbooks.—*M.R.*

11B-110

551.509(02)

*Peterssen, Sverre, **Weather analysis and forecasting**. 2d ed. N. Y., McGraw-Hill, 1956. 2 vol. Vol. 1, **Motion and motion systems**. 428 p. Vol. 2, **Weather and weather systems**. 266 p. numerous figs., tables, eqs., and bibliog. at end of each ch. in each vol. DWB, DLC (QC995.P52). Review of Vol. 1-2 by Jerome Spar, in *Science*, Wash., D. C., 124(3225):728-729, Oct. 19, 1956.—The first volume of the completely revised 2d edition of PETERSEN'S textbook on synoptic analysis and forecasting covers in 19 chapters the theory and some applications of equations of motion (and derived equations) to analysis of pressure, temperature and wind fields, fronts, and to numerical or graphical prediction. The second volume (chapters 20-28) covers the more direct applications to forecasting: specific elements, air mass modification, thermodynamics, clouds, precipitation, fog, stratus, objective forecasts of weather, local conditions, plus synoptic climatology. This is one of the major tools for study or reference in meteorology. (*Same item as 11A-14, MAB.*) *Subject Headings:* 1. Analysis and forecasting textbooks 2. Objective forecasting 3. Numerical rainfall forecasting 4. Synoptic climatology 5. Synoptic-dynamic analysis. I. Jacobs, W. C. II. Thompson, J. C. III. Malone, T. F.—*M.R.*

11B-111

551.5(02)

Peterssen, Sverre, **Introduction to meteorology**. 2d ed. N. Y., McGraw-Hill, 1958. 327 p. 213 figs. (some fold.), 14 tables, 34 refs. DLC (QC861.P4 1958)—A complete revision, after 17 years, of the famous 1941 elementary college text on meteorology, written for the wartime training schools, but now useful for beginners in professional courses in meteorology, or for geography, agriculture, industrial or aviation students who wish to understand the weather and climate. Advanced physical meteorology and synoptic forecasting have been deliberately avoided and little mathematics is employed. The main chapters cover the atmosphere, instruments and observation, clouds and precipitation, cloud physics, heat and temperature changes, radiation and heat exchange, showers, thunderstorms, hail and tornadoes, haze, mist, smog and fog; the laws of motion, local wind systems; general circulation; air masses; fronts and frontogenesis; cyclones and anticyclones; tropical storms, temperature regime; precipitation regime; world climate and simple weather lore and forecasting. Nearly all of the illustrations and references are of recent vintage. (*Same item as 10.2-12, Feb. 1959, MAB.*) *Subject Heading:* 1. Meteorology textbooks.—*M.R.*

11B-112

551.511:532(02)

†Prandtl, Ludwig, **Führer durch die Strömungslehre**. [Guide to fluid dynamics.] 3d ed. Brunswick, Vieweg, 1949. 407 p. 347 figs., numerous refs. and eqs., classified bibliog. DLC (QA911.P7 1949). Transl. of 1942 ed. into English appeared with title: **Essentials of fluid dynamics**. London, Glasgow, Blackie and Son, 1952. 452 p. Price: 35 sh. DLC (QA911.P714 1952). A second transl. with title **Guide to flow theory**, issued Dayton, Ohio, Central Air Documents Office (Navy-Air Force), 1949. 376 p. DLC (QA911.P714 1949). First German ed. was issued 1931, with title **Abriss der Strömungslehre**. 2d ed. was transl. into Russian with title **Гидроаэромеханика**, issued Moscow, Izdvo-Inostrannoi Lit-ry, 1949. 520 p. DLC (QA911.P718). 3rd German ed. (with title **Führer . . .**) issued 1942. DLC (QA911.P7 1942). (*See 9-54, 4A-123, and 6B-*

63 for abstracts on original German; see 4A-205 for mention of 1952 English transl.)—Although not essentially a text on meteorology, this 3rd ed. (i.e. fifth edition of Prandtl's original work on hydrodynamics, first pub. 1931) of the original *Abriß der Strömungslehre* contains so much theoretical material that is basic to all branches of meteorology, and much that is actually to the study of the atmosphere and its boundaries, that it is one of the treatises which must be included in any meteorological research library. Much of the material is the result of original theoretical or experimental research, and the numerous illustrations and equations are easily interpreted by any meteorologist, whether he reads German or not. Subjects treated in detail include: properties of fluids, boundary layers, propagation of waves, turbulence, convection, friction or drag, wind waves, capillary action, air pressure, barometry, the properties of air-water, solid-water and solid-air mixtures, turbulent heat exchange, convective cells, Coriolis force, general circulation of the earth and sea, trade winds, vortices, slope winds, motion of stable air masses, visibility, aerodynamic properties of wind mills or anemometers; in addition to the classic theories of hydrodynamics (equations of motion or continuity, Bernoulli's equations, vorticity, stationary motion, etc.). The 1949 edition contains many references and notes not found in the 1942 or 1944 editions, and in addition has made available the results of much research made during the war, both in Germany and abroad, on convection, turbulence and boundary layer phenomena. (*Same item as 9-54, Sept. 1950, MAB.*) *Subject Headings: 1. Fluid mechanics textbooks 2. Mechanics of the atmosphere.*—M.R.

11B-113

551.511:551.551(02) 551.573

†Priestley, Charles Henry B. (*Chief, Div. Met. Physics, C.S.I.R.O., Australia*), **Turbulent transfer in the lower atmosphere**. Chicago, Univ. of Chicago Press, 1959. 130 p. 22 figs., 10 tables, 123 refs., eqs. Price: \$3.75. **DLC** (GC880.P73)—A thorough monograph based on a series of lectures on turbulent transfer given by the author at the Univ. of Chicago in 1951 and expanded to include a chapter on evaporation and a section on geostrophic wind approximation, plus considerable recent material not available at the time of the lectures. After an introductory chapter (Ch. 1), there is one (Ch. 2) on eddy flux and its measurement; one (Ch. 3) on shearing stress and wind profiles; (Ch. 4) heat convection and temperature profile; (5) spectrum of turbulence and structure of free convection; (6) theories of buoyant motion; (7) evaporation and (8) evolutionary aspects of energy transfer (diurnal and air mass and latent heat effects). The balance between theory and pertinent experimental results is nicely maintained throughout the book. The chapter on evaporation is restricted to basic work on turbulent transfer in the atmosphere, using the aerodynamic approach on the one hand and the energy balance method on the other (enabling calculations of dew). Formulas for quantitative estimation of evaporation from saturated and from open water surfaces for inclusion of stability, light winds, bare soil and grass, and latent heat are included. A good bibliography of papers cited in this unique book is appended along with an author and subject index. (*Same item as 10.10-11, Oct. 1959, MAB.*) *Subject Headings: 1. Turbulent transfer textbooks 2. Shearing stress 3. Evaporation.*—M.R.

11B-114

551.510.41:546.214(02):016

†Prokof'eva, I. A., **Atmosfernyiŭ ozon**. [Atmospheric ozone.] Moscow, Akademiia Nauk, 1951. 231 p. graphs, charts, diagrs., tables, 213 refs. Price: 11 rubles, 50 kop. **DLC** (QC881.P7)—A systematically organized and technical monograph covering every aspect of: a) instrumentation, b) computation and c) interpretation of data on ozone in the atmosphere, based on work of Russian and foreign scientists from 1879 to 1950. The bibliography of 213 items (of which 58 are in Russian) covers most of the important literature up to 1949. (*Same item as 3.4-9, 6B-104 and 11A-80, MAB.*) *Subject Headings: 1. Ozone textbooks 2. Bibliography on ozone.*—M.R.

11B-115

551.46(02)

†Proudman, Joseph, **Dynamical oceanography**. London, Methuen, 1953. 409 p. diagrs., tables, eqs., refs. Review by H. Stommel in *Science*, 118(3065):365, Sept. 25, 1953. **DLC**—First textbook in English devoted to theoretical oceanography. The dynamical nature of all the chief kinds of water movements are elucidated and their characteristic relationships demonstrated. Included are chapters on gravity, pressure, turbulence, internal friction, thermodynamics (Ch. 10, unique in oceanographic literature), seiches, progressive waves, and tides. Starting from the fundamental principles of dynamics and of thermodynamics, with the physical properties of sea water, and assuming the conditions which arise outside the ocean, deductions are made relating to the movement of the waters of the ocean. Most of the mathematical parts of the book (kept basic for the sake of readers with little mathematical knowledge) refer to conditions which have been ideally simplified, but the theoretical relationships deduced are compared with corresponding relationships based on observations made at sea. A detailed table of contents, author and subject indexes, historical summaries and bibliographies at the end of each chapter add considerably to the book's value as a reference work. (*Same item as 5A-58, Jan. 1954, MAB.*) *Subject Heading: 1. Dynamic oceanography textbooks. I. Stommel, H.—From author's introduction.*

11B-116

551.515.11:551.513.1(02)

†Raethjen, Paul, **Dynamik der Zyklonen**. [Cyclone dynamics.] *Probleme der Kosmischen Physik*, Leipzig, Vol. 27, 1953. 384 p. 92 figs., 3 tables, bibliog. p. 339-373, 357 eqs. Price: DM 35. **DLC**—A critical evaluation of cyclone theories and models of cyclogenesis, developed during the past century in Europe and America, is presented here from the point of view of modern observations and theoretical concepts, combined with the extensive results of the author's own research in this field. The first half of the book gives the physical explanation of the processes involved, emphasizing that the observed processes must be used as the basis for construction of simple theoretical models, while mathematical simplifications, made a priori, can give wrong results. Among the numerous aspects discussed are: formation of vortexes, frontal waves, two-layer pressure waves, tropopause waves, frontal zones, action centers and central cyclones, four-cell pressure fields, mass exchange in frontal cyclones, jet stream, meander and cutoff, planetary and monsoonal general circulation and their relation to the formation of cyclones, tropopause circulation, principal conditions for cyclogenesis (wind vortex, cyclonic shear, thermal and dynamic pressure fields), cyclogenetic models (injection from the stratosphere, convective cyclone), role of gliding Austausch, etc. The second part can be considered as a handbook of mathematical approaches to the problem of cyclones. In particular, information can be found on vorticity and its individual changes, the effect of horizontal divergence and vertical movements, statics and kinematics of pressure field changes, including wedge shape injections (Keileinschub), two-dimensional Austausch of momentum (effect of isotropic and monotropic exchange), tropopause deformations, long waves, delta-cyclogenesis, small scale vertical convection, convective cyclones, typhoons, monsoonal lows, etc. The book is well suited to fill the gap between the practicing meteorologist by facilitating his understanding of modern theories, and the theoretician by showing him what actually is going on in the atmosphere. (Same item as 5.3-10, March 1954, MAB.) **Subject Headings: 1. Cyclone dynamics textbooks 2. General circulation.**—A.A.

11B-117

551.5(02) 551.58(497.2)

Rainov, R., **Meteorologija**. [Meteorology.] 2d ed. rev. Sofia, Universitetska Pechatnitsa, 1948. 520 p. 198 figs., tables, refs., eqs., table of symbols p. 517. **DLC**—A standard college textbook on meteorology, containing a number of unusual features which make it especially useful for training government meteorologists as well as those intending to engage in university or other fields where meteorology is required. The first chapters cover the theoretical aspects of the structure and composition of the atmosphere: gas laws, equations of motion, thermodynamics laws, etc. are taken up. Radiation in the atmosphere is treated in all of its aspects in Ch. II, with a great deal of illustrative data presented to give a quantitative basis for understanding the theory and applications of this most important element; Temperatures of the earth's soil and water surfaces comprise Ch. III; Temperature of the microclimatic layer, Ch. IV; of the upper atmosphere including the stratosphere, Ch. V; Water vapor, Ch. VI; Condensation and hydrometeors, Ch. VII; Precipitation, Ch. VIII; Pressure, Ch. IX; Wind, Ch. X; Turbulence, Ch. XI; General circulation and monsoons, trades, etc., Ch. XII; Synoptic meteorology, Ch. XIII; Storms of various types, Ch. XIV; Short range and long range forecasting, Ch. XV; and Climatology, Ch. XVI. The last named chapter is especially slanted towards the climate of Bulgaria as are many of the illustrations and applications in the other chapters. The point of view of a synoptic dynamic meteorologist is of course mentioned in all of the discussion on climatology, but the particular (i.e., agricultural) applications and the interests of the instrumental workers are not neglected. (Same item as 5.9-14, Sept. 1954, MAB.) **Subject Headings: 1. Meteorology textbooks 2. Climatology 3. Bulgaria.**—M.R.

11B-118

551.510.535:551.510.62(02)

†Rawer, Karl, **Die Ionosphäre. Ihre Bedeutung für Geophysik und Radioverkehr**. [The ionosphere. Its importance in geophysics and radio communication.] Groningen, P. Noordhoff, 1953. 179 p. 67 figs., 143 refs., 68 eqs. **DLC**—A complete text on the use of radio in ionospheric research. Ch. I takes up methods of observation by echoes, spectroscopic methods for aurora and airglow, magnetic, meteor and luminous night clouds, and soundings; Ch. II gives results of observations by echo methods, magnetic data, composition, pressure, density and temperature. Ch. III discusses theories of ionospheric stratification (origin and disappearance of ionization and explanation of different layers. Ch. IV takes up normal and irregular changes of the ionosphere (D, E, F₂, F₁, E₂, G and E_z and influence of magnetic storms, eclipses, polar summer and night, commencements). Ch. V discusses influence of ionosphere on propagation of radio waves and forecasting propagation. (Same item as 6D-297, April 1955, MAB.) **Subject Headings: 1. Ionosphere textbooks 2. Ionospheric propagation.**—M.R.

11B-119

550.34(02)

†Richter, Charles Francis (Calif. Inst. of Technology), **Elementary seismology**. San Francisco, W. H. Freedman, 1958. 768 p. 190 figs., tables (in appendix), refs. at end of many chs., bibliog.

p. 719-735 (790 refs.), eqs. **DLC** (QE534.R5). Review by Markus Båth in *Tellus*, Stockholm, 11(2):257-258, May 1959. Review by E. Tams in *Beiträge zur Geophysik*, Leipzig, 68(3):190-192, 1959. Review by A. N. Tandon in *Indian Journal of Meteorology and Geophysics*, New Delhi, 10(4):462-463, Oct. 1959.—A nontechnical but thorough and competent textbook on seismology for geology or other students not intending to specialize in geophysics or seismology. Mathematics is kept to a minimum except in the chapters on elastic waves, tensors (stress and strain), seismic waves (friction, reflection and propagation) and in the appendices. However, graphic material is profuse; excellent bibliographies added to each chapter and a chronological bibliography of 800 references, chronological table of earthquakes 1897-1956, a table of seismological stations scattered throughout the world with their coordinates, and a very detailed index to authors, subjects, places and earthquakes give good reference and source material for teachers and research workers in seismology and other fields. The book consists of 33 chapters and 17 appendices divided into 3 major sections: I. Observation and nature of quakes including foreshocks, aftershocks, numerous earthquakes, effects on building and construction, on ground and surface water, etc., intensity, isoseismals, types (volcanic), tectonics, faulting, seismograph theory and practice, deep focus quakes, locating earthquakes, international seismology, magnitude, energy, microseism, risk and protection. Pt. II covers geography and geology of earthquakes, descriptions of great and famous quakes (regional treatment), etc. Useful tables, theory and data for information and calculation are appended. In Pt. III microseisms are treated very briefly on p. 375-379. *Subject Headings*: 1. Seismology textbooks 2. Seismology bibliographies 3. Earthquake chronology 4. Tectonics.—*M.R.*

11B-120

551.5(02)

*Riehl, Herbert (*Dept. of Met., Chic. Univ.*), **Tropical meteorology**. N. Y., McGraw-Hill, 1954. 392 p. tables, numerous figs., extensive bibliog. at end of each ch. **DLC**—This unique and nicely edited textbook is the outgrowth of the author's experience in tropical meteorology which began in 1943 at the Institute of Tropical Meteorology at San Juan, Puerto Rico, and continued with the publication of in-service training courses for the Air Force. The 12 chapters deal with: 1) Winds and pressure, 2) Temperature, 3) Rainfall, 4) Diurnal and local effects, 5) Convection, 6) Physics of tropical rain (by R. WEXLER), 7) Weather observation and analysis, 8) Divergence and vorticity, 9) Waves in the easterlies, 10) Low latitude disturbances, 11) Tropical storms and 12) General circulation. The subjects of rain from nonfreezing clouds and waves in the easterlies are particularly important and are treated in detail. Mathematics is avoided as much as possible, though in treating subjects like vorticity and divergence it cannot be eliminated. (*Same item as* 5.8-9, Aug. 1954, *MAB.*) *Subject Heading*: 1. Tropical meteorology textbooks.—*M.R.*

11B-121

551.5:531.5(02)

Sänger, Raymund, **Ballistische Störungstheorie unter besonderer Berücksichtigung der Witterungseinflüsse**. [Ballistic disturbance theory with special consideration of weather influences.] Basel, Verlag Birkhäuser, 1949. 226 p. 45 figs., 8 tables, numerous eqs. Append. **DLC** (UF820.S22), **DWB**—A manual based on the experience of the Swiss Artillery Weather Service during and since World War II. The book presents not only the basic differential equations which enter into the general and special theories of ballistic deviations; but many tables and nomograms, based on empirical data, make it possible to quickly calculate the effect of variations in density, temperature, wind, earth's rotation and trajectory, rain, etc. on the path of a projectile. A chapter is devoted to the standard atmosphere, one to the generalized Darrieu formulas, another to the methods of observation and computation employed by the Ballistic Weather Service in Switzerland (including several excellent photographs of equipment and sounding devices), and a separate chapter to each of the above normal elements which affect the flight of missiles. (*Same item as* 4-4, April 1950, *MAB.*) *Subject Headings*: 1. Ballistic meteorology manuals 2. Manuals 3. Switzerland.—*M.R.*

11B-122

551.584:551.586:63:551.501.4(02) (47)

*Sapozhnikova, Serafima Afanas'evna, **Mikroklimat i mestnyi klimat**. [Microclimate and local climate.] Leningrad, Gidrometeoizdat., 1950. 239 p. 89 figs., 123 tables, graphs, eqs. **DLC** (QC981.S33)—A textbook for geography and meteorology students in the universities and hydro-meteorological service training centers, covering the latest concepts of micrometeorology and the climate of small areas (fields, forests, valleys, cities, etc.). The first section covers the physical basis of micro- or local climate (heat and radiative balance, heat exchange in soil and from soil to air, turbulent exchange, evaporative heat loss and diurnal variation of these factors, advection, etc.); Sec. 2 deals with stability (inversions, wind profile and microfluctuations of temperature); Sec. 3 with the microclimate of the soil and overlying layer of air (climate in crops, effects of snow cover, slopes, etc.); Sec. 4 with local climates (mountains, cities, forests, and local variations of wind, cloudiness, precipitation, humidity and temperature); Sec. 5 covers the methods of combatting heat, drought, frost and wind by using shelter belts and new methods of cultivation; Sec. 6 discusses methods of research or investigation in micro- or local climatology (accuracy of observation, instru-

ments and methods of observation, networks, anemometry, thermometry, fruit frost protection, plants as indicators of climate (phenology), compilation of records, length of record, how to adapt short records, etc. The work is full of schematic diagrams and representative tables of data, charts and graphs. At the beginning is a review of the history of microclimatology and local climatology. The main emphasis is on applications to agriculture and town planning, especially in the U.S.S.R. and using Soviet data. (*Same item as 3.7-10; 4C-296, MAB.*) *Subject Headings:* 1. Microclimatology textbooks 2. Mesoclimatology 3. Agricultural climatology 4. Climatic control 5. Observation techniques 6. U.S.S.R.—*M.R.*

11B-123

551.501.7:551.509.31 (02)

*†Saucier, Walter J. (*Dept. Oceanog., Texas A. & M. College*), **Principles of meteorological analysis**. Chicago, Univ. of Chicago Press, 1955. 438 p. numerous figs., tables, eqs. Refs. at end of each chapter. **DLC** (QC861.S3). Review by David K. Todd in *Science*, 123(3188):187-188, Feb. 3, 1956.—A highly specialized and useful technical textbook for the benefit of those who have had basic courses in dynamic meteorology and climatology and who wish to study (or teach) practical synoptic analysis. A chapter (p. 1-16) is devoted to a definition of the standard parameters and a representation on Northern Hemisphere charts of the mean state of the upper atmosphere in Jan. and July. Ch. 2 describes and illustrates all manner of charts and diagrams for synoptic, dynamic and aerological purposes. Ch. 3 goes into hydrostatic and static stability; Ch. 4, scalar analysis; Ch. 5, graphical analysis (addition, subtraction, multiplication, differentiation, etc.); Ch. 6, cross section analysis; Ch. 7, isobaric analysis; Ch. 8, isentropic analysis; Ch. 9, surface, frontal and isallobaric charts; Ch. 10, kinematic analysis; Ch. 11, broad scale analysis; Ch. 12, local analysis (vertical time sections, hodographs, etc.) and Ch. 13, tropical analysis. A marked cold front situation (over the Atlantic States) with strong NW flow over most of North America is used as an example and illustrated by charts for March 1, 1950 throughout the text. References are inserted at the end of nearly every section. The outline of sub-sections of the 13 chapters is very detailed (240 headings) and makes it easy to find material in any aspect of this complicated and therefore ill-defined field. (*Same item as 7.3-7, March 1956, MAB.*) *Subject Headings:* 1. Meteorology analysis textbooks 2. Synoptic analysis 3. Aerological analysis 4. Isentropic analysis 5. Tropopause analysis 6. Tropical analysis.—*M.R.*

11B-124

551.509.3 (02)

*†Scherhag, Richard, **Neue Methoden der Wetteranalyse und Wetterprognose**. [New methods of weather analysis and weather forecasting.] Berlin, Springer-Verlag, 1948 [i.e., 1949]. 424 p. 213 figs., 43 tables, 897 refs. **DLC** (QC995.S37), **DWB**—This elaborate textbook is systematically arranged, taking the reader through the entire process of map analysis and forecasting, from the preparation of surface and upper air synoptic charts, through the techniques of compiling isallobaric and thickness charts, to the drawing and interpreting of the prognostic charts and the final preparation, issuance and even the verification of general or special, short, medium or long range forecasts. In addition there is an introductory section on the historical development of synoptic meteorology describing the various thermodynamic and aerological charts in use at the time or in the past, and another section on the general circulation and its effect on the weather, wherein is expounded at some length the Scherhag theory of stratospheric compensation (normal compensation and anomalous compensation) which was used by the author in compiling charts of baric topography for the 500, 225, 96 and 47 mb pressure surfaces. Sec. III concerns **Weather analysis**, with well illustrated sections on the dynamic high, the cold high, principal air masses, frontal zones, cyclones, hurricanes, cold air sinks and stratospheric movements, followed by examples of the various types of air flow and peculiar synoptic situations over Europe. The stupendous bibliography contains 897 references, over 50 of which are works of the author. Very little material published after 1944 is included, although the book was completed in August 1948 and put on sale in January 1949. (*Same item as 1-52, Jan. 1950, MAB.*) *Subject Headings:* 1. Synoptic analysis 2. Prognostic charts 3. Weather forecasting textbooks.—*M.R.*

11B-125

551.583.7 (02) :016

†Schwarzbach, Martin, **Das Klima der Vorzeit: eine Einführung in die Paläoklimatologie**. [The climate of the past: an introduction to paleoclimatology.] Stuttgart, F. Enke, 1950. 211 p. 70 figs., tables, 850+refs. (mostly without titles). **DLC** (QC884.S3)—An excellent summary of the present knowledge of paleoclimatology. Ch. I sets out historical development of the subject (photos of paleoclimatologists). Ch. II describes the factors affecting present climate. In Ch. III the various lines of evidence (zoological, botanical, lithological) for past climates are described in detail—for warmer and cooler, drier and rainier climates, traces of wind direction and speed, thunder, seasonal and long-period climatic variations, and quantitative methods of calculating geological temperatures. Ch. IV deals briefly with geological time. Ch. V sets out the known facts about the climates of the successive geological epochs. In Ch. VI the numerous hypotheses of climatic change

are classified and critically discussed; the author's conclusions (p. 190) are that climate depended to a large extent on the changing configuration of the earth, glaciations following uplift (after long intervals), but this factor is not by itself sufficient to explain all the facts. The "radiation curve" (elements of the earth's orbit) appears unable to account for repeated glaciation and the ultimate cause is presumably variations of solar radiation. Pole movements and continental drift have played no part in the later stages of the earth's history but seem necessary to account for the Permo-Carboniferous glaciation. The "solar-topographic" hypothesis of R. F. FLINT (1947) is favored. The warm periods which made up most of geological time are attributed to terrestrial causes. The last chapter discusses very briefly the possibility of future climatic changes. There is an excellent index. (*Same item as 8-118 and 6B-86, MAB.*) *Subject Headings: 1. Paleoclimatology textbooks 2. Bibliography on climatic changes.—C.E.P.B.*

11B-126

533.6(02)

Scorer, R. S. (*Imperial College, London*), **Natural aerodynamics**. N. Y., Pergamon Press, 1958. 312 p. figs., 22 plates, eqs., refs. p. 307. (*International Series of Monographs on Aeronautical Science and Space Flight, Div. 2, Aerodynamics, Vol. 1.*) **DLC** (QC880.S38)—A unique text which grew out of a series of lecture notes for extramural courses in the Dept. of Meteorology at Imperial College, intended for aviators, engineers, geographers, meteorologists, etc. The treatment is moderately mathematical but not to the extent that the mathematics overbalances the empirical, descriptive or illustrative material in any chapter. The 11 chapters cover: 1) inertia forces; 2) motion on a rotating earth; 3) vorticity; 4) viscosity; 5) boundary layers; 6) wakes and turbulence; 7) convection and thermals; 8) plumes and jets; 9) air waves (explosion, tidal, mountain waves, etc.); 10) clouds and fallout; 11) philosophy of method (the mathematicians, the physicists and the geographers method and dimensional analysis). Schematic diagrams are included to illustrate every process or concept. (*Same item as 10.1-11, Jan. 1959, MAB.*) *Subject Headings: 1. Natural aerodynamics textbooks 2. Convection 3. Turbulence 4. Radioactive fallout from clouds.—M.R.*

11B-127

551.574.1(02) 551.594.21(02)

†Shishkin, N. S., **Oblaka, osadki i grozovoe elektrichestvo**. [Clouds, precipitation and thunderstorm electricity.] Moscow, Gosud. Izdat. Tekhniko-Teoreticheskoi Literatury, 1954. 280 p. 82 figs., 21 tables, 156 refs. **DLC** (QC921.S47)—An important work on various aspects of cloud physics and thunderstorm electricity. The work reported is based on original Russian as well as on "western" research up through 1953 (in the list of 156 references, 93 are from native Russian and 63 from foreign sources). In the introduction, the author critically reviews the various theories of cloud physics and rain formation (i.e., FINDEISEN-BERGERON, BOWEN, LANGMUIR, etc.), then in Ch. I takes up the dynamic and thermodynamic processes in water-vapor transfer and cloud formation, cloud forms, and precipitation types; Ch. II, the methods of cloud and raindrop and water content measurement; Ch. III, the microstructure of cloud, and radar measurements; Ch. IV, laboratory research on growth, evaporation and freezing of cloud drops, and crystal growth; Ch. V, condensation and sublimation as factors in cloud particle growth; Ch. VI, coagulation of various types as factors in particle growth; Ch. VII, changes in phase involved in growth or formation of hydrometeors; Ch. VIII, basic theory of convective clouds, thunderstorms and hail; Ch. IX, electrical fields in clouds and Ch. X, basic theory of thunderstorm electricity. The book contains a great deal of theory, and quantitative data in the form of tables and curves, scatter diagrams and histograms. The illustrations of radar scope views are taken from U. S. material, but most of the illustrations are from U.S.S.R. sources. (*Same item as 6.3-1, March 1955, MAB.*) *Subject Headings: 1. Cloud physics textbooks 2. Thunderstorm electricity.—M.R.*

11B-128

551.46(02)(09)

†Shokal'skiĭ, Iuliĭ Mikhailovich, **Okeanografiia**. [Oceanography.] 2d ed. Leningrad, Gidrometeoizdat, 1959. 536 p. 247 figs., tables, bibliog. p. 517-523. **DWB** (551.46 S559ok 1959), **DLC** (GC11.S47 1959)—The classical textbook on oceanography by the great Russian oceanographer SHOKAL'SKIĖ published in 1917 (see 5A-11, Jan. 1954, MAB), is here reproduced in its entirety with some supplementary material taken from his 1933 text entitled *Fizicheskaiia okeanografiia*, (see 5A-251), and from manuscripts he was using to prepare a new work on oceanography at the time of his death. All units are converted into metric units, all geographical names converted to present usage, and a few errors in actual data corrected. This volume is the first of 3 volumes of the selected works of SHOKAL'SKIĖ. The second is on articles on oceanography and physical geography and the Arctic and Antarctic; and the third on hydrography, geodesy and cartography. The textbook itself covers in 10 substantial chapters divided into 3 main parts: I. The history of ocean study and scientific oceanography, II. Specific subjects: 1) distribution size and character of oceans, 2) sea level, 3) bottom relief, 4) bottom soundings and characteristics, 5) composition and salinity, 6) water temp., 7) optics and acoustics; and III. Water movements: 1) waves, 2) tides, and 3) currents. A bibliography and place, author and subject indexes are provided and numerous charts, diagrams and tables, photos,

instrument drawings and nomograms included by way of illustrations of world-wide conditions mostly before the First World War. Mathematical treatment is evident throughout the work. *Subject Headings:* 1. Oceanography textbooks 2. Russian languages 3. History of oceanography. I. Snezhinskiĭ, V. A.—M.R.

11B-129

551.5:551.46(02)

†Shuleĭkin, Vasilii Vladimirovich, *Fizika moria*. [Physics of the sea.] 3d ed. Moscow, Akademiia Nauk SSSR, 1953. 989 p. 615 figs. (some col., some fold.), foot-refs., numerous eqs. Fold. chart in pocket. **DLC** (GC11.S5 1953)—This monumental work contains nearly 50% more material than did the second edition (1941, *see* 2-184), which in itself was unique in its field. The present work is narrower in scope but more intensive than the equally comprehensive work of SVERDRUP (*see* 5A-32, Jan. 1954, *MAB*), covering less of the field of chemical, geological and biological oceanography, and more of the physical and meteorological aspects (though in this respect SVERDRUP's book is not to be underestimated). The separate parts (each with 10-20 chapters) cover: 1) Dynamics of ocean currents, 2) Dynamics of tides and tidal "waves" (not "tidal waves"), 3) Dynamics of surface and internal waves (80 p.), 4) Thermal properties of the sea (100 p.) including exchange between sea and air, 5) Physical "causes" of climate and weather, 6) Optics of the sea, 7) Acoustics of the sea, 8) Molecular physics of the sea, 9) Biological physics of the sea and 10) Technical physics of the sea. Considerable attention is given to the author's ideas on marine and continental influences on climate, climatic changes, atmospheric waves (theory of thermobaric waves or seiches in the atmosphere), singularities, etc. involving beautiful, colored charts. Some sections are highly theoretical—there being hardly a subject in the book on which the author has not made some original contribution since 1922, for instance *Drift of ice field* (1938-41), *Wave dynamics* (1924-54), *Thermics* (1926-29-31), *Optics* (1922). He also illustrates many instruments which he has invented. The author does not neglect references to the work of DEFANT, SVERDRUP, KRÜMMEL, BJERKNES and ROSSBY, as well as to that of Russian authorities such as SHOKAL'SKIĖ, DOBROKLONSKIĖ, ZUBOV, etc. A few odd subjects such as the "sound of the sea" and the dynamics of fish have practical as well as theoretical interest, and are covered in detail. A good author and subject index is appended. There are over 125 references to the author's own work. (*Same item as* 11A-18, *MAB*.) *Subject Headings:* 1. Physical oceanography textbooks 2. Marine meteorology.—M.R.

11B-130

551.46(02)

*†Shuleĭkin, Vasilii Vladimirovich, *Kratkiĭ kurs fiziki moria*. [Short course in physics of the sea.] Leningrad, Gidrometeoizdat, 1959. 477 p. 309 figs., tables, bibliog. at end of each ch. (207 refs.), numerous eqs. **DWB** (551.46 S562kr), **DLC** (GC11.S515)—This is the first comprehensive course in theoretical physical oceanography for undergraduate students of oceanography or for specialists in that or in peripheral disciplines. It is not half as voluminous as the author's "magnum opus" (*Fizika Moria*, 3rd ed., 1953, *see* 11B-129), but on the other hand, it does not have so much irrelevant material and is more systematic and hence, readily usable. The 8 main chapters (each with a dozen or more sub-sections) cover: I. theory of ocean currents related to wind and convection; II. theory of tidal and systematic waves; III. theory of wind waves; IV. thermal properties of the sea; V. optics of the sea; VI. acoustics of the sea; VII. molecular physics of the sea (ice, evaporation, etc.); VIII. magnetic and electrical phenomena of the sea. Over 200 references are arranged by chapters at the end of the text. A great deal of theory and graphical presentation are included. *Subject Heading:* 1. Physical oceanography textbooks.—M.R.

11B-131

551.322.1(02) 551.322.1:016

†Shumskii, P. A., *Osnovy strukturnogo ledovedeniia*. [Principles of structural glaciology.] Moscow, Akademiia Nauk SSSR, 1955. 491 p. 124 figs., 6 tables, bibliog. p. 468-477, eqs. **DLC** (QE576.S63). Transl. into French by J. Pietresson de Saint-Aubin and A. Baur, with title *Principes de glaciologie structurale*. Issued Gap, Louis Jean, 1957. tables, etc. **DLC** (QE576.S634)—This substantial textbook consists of 20 chapters divided among 3 major parts: I. Mineralogy and crystallography of ice; II. Petrology of ice congelation, compaction and metamorphic ice, and III. Geography of ice. Among the separate chapters are: structure, physical characteristics (temp., pressure, conductivity, freezing, sublimation, crystal growth in water and in atmosphere), composition, methods of research, various types of ice, changes and cycles, various zones in glacial regions, etc. Firn, the chionosphere, frost, ablation, water balance, thermal balance, albedo, hail, icing of objects, glacial movements, snow "dunes," sastrugi, infiltration, river, sea and lake ice and blizzards, are among subjects discussed in their logical places. Useful tables of data, nomograms, visual photographs of peculiar ice structures are included. There are nearly 400 refs. in the bibliography on snow—over half to western literature. (*Same item as* 9.10-12, Oct. 1958, *MAB*.) *Subject Headings:* 1. Glaciology textbooks 2. Ice structure 3. Ice bibliographies 4. Ice classifications 5. Firn.—M.R.

11B-132

551.546(02)

†Snezhinskiĭ, V. A., **Prakticheskaia okeanografiia (raboty v otkrytom more)**. [Practical oceanography for work in the open sea.] 2d rev. ed. Leningrad, Gidrometeoizdat., 1954. 670 p. 39 tables, 377 figs. (incl. photos), ports., 158 refs. **DLC** (GC51.S6 1954)—The second edition of this unique text is 70 pages longer than the first, has one less chapter (16 instead of 17), and is organized into three major parts instead of 6. (For abstract on first ed., see 3.11-8, Nov. 1952, *MAB*.) The major parts are: I. General (history, planning and preparation for expeditions, observations and their compilation, instruments and their correction, calibration, etc.); II. Deep sea measurements and III. Observations near sea surface (tide and coastal observations, currents, waves, temperature observations, salinity, and optical measurements). The chapter on energy exchange and evaporation has been omitted. References cover literature through 1952. All manner of oceanographic and hydrographic instruments, equipment and their use are discussed and illustrated. (*Same item as* 6.7-11, July 1955, *MAB*.) *Subject Headings*: 1. Oceanographic expeditions 2. Oceanographic equipment 3. Soviet oceanography textbooks.—*M.R.*

11B-133

551.508.71(02)

Spencer-Gregory, Hamer and Rourke, Edward, **Hygrometry**. N. Y., Pitman; London, Lockwood, 1957. 254 p. 118 figs., 17 tables, 38 refs., eqs. Price: \$7.95. **DLC** (QC915.S6)—The most thorough treatment of all aspects, both practical and theoretical, of hygrometry since DE SAUSSURE's famous *Essais sur l'hygrométrie* published in 1783. After a preface outlining the history of hygrometry since LEONARDO DA VINCI (1500) and the failure of all hygrometers to meet rigid requirements, there is an introductory chapter describing about 10 types of hygrometers, their principles and calibration. Ch. II takes up the Vapor pressure of water and ice; Ch. III, Vapor pressure of solutions; IV) Dew point practice; V) Moisture content of highly compressed gases; VI) Assmann psychrometer; VII) Hair hygrometer; VIII) Diffusion hygrometer; IX) Gravimetric and electrolytic hygrometer, and X) Lag effects. Useful tables and derivations are appended or included in the text, along with nomograms and empirical curves, etc. A good index is also included. The diffusion hygrometer is considered the most promising for development of an absolute hygrometer. (*Same item as* 9.7-6, July 1958, *MAB*.) *Subject Headings*: 1. Hygrometry 2. Hygrometers.—*M.R.*

11B-134

551.508(02)

†Sternzat, Moiseĭ Semenovich and Sapozhnikov, A. A., **Meteorologicheskie pribory, nabliudeniĭ i ikh obrabotka**. [Meteorological instruments, observations and their analysis.] Leningrad, Gidrometeoizdat, 1959. 519 p. 205 figs., 104 tables, eqs., 20 appendices (some fold. in pocket). **DWB** (M08 S839me)—A comprehensive textbook or manual for Soviet hydrometeorological observers, treating all phases of observations, equipment and the compilation of records from such meteorological observations. The physical principles as well as practical operations are fully considered. Pt. I, on **Meteorological measurements**, takes up: 1) stations, 2) temperature, 3) humidity, 4) precipitation, 5) evaporation, 6) radiation and actinometry, 7) pressure, 8) wind, 9) cloudiness, 10) miscellaneous phenomena and glaze, 11) visibility and 12) distant recording and automatic stations. Pt. II, on **Compilation of observational material**, takes up: 13) working up records and computing tables, 14) technical verification of various types of records, 15) critical verification of same, 16) annual summaries and 17) yearbook compilation. Appended are useful tables of all types and sample forms and tables. Specific types of instruments and forms used in the U.S.S.R. are cited and discussed in all cases. Instruments and records are illustrated in great detail with photos and line drawings, and calibration curves and tables, and resulting data presented. *Subject Headings*: 1. Meteorological observations 2. Meteorological instrument textbooks 3. Methods of compilation of observations 4. Soviet meteorological station equipment 5. Automatic weather stations.—*M.R.*

11B-135

551.594.5(02)

*†Störmer, Carl, **The polar aurora**. Oxford, Clarendon Press, 1955. 403 p. 213 figs. (incl. photos), tables, numerous refs. throughout, additional refs., p. 400-403. (*International Monographs on Radio*, ed. by Sir Edward Appleton and R. L. Smith-Rose.) **DLC** (QC971.S77). Review in *Royal Met. Soc., Quarterly Journal*, 82(351):115, Jan. 1956.—This is the first substantial textbook on the aurora to be published in the English language by the man who has become world famous for his life's work of photographing the aurora and studying its nature. The book could well have consisted entirely of the author's own findings which resulted mainly from over 50 years of study of parallactic photographs which he himself made by a method which he devised and many others have adopted. However, there is an abundance of reference to work of others in this field, as can be seen in the numerous foot-references and the added references to recent literature not cited in the text. The book is divided into two major parts which deal with: I. the descriptive aspects and II. the purely physical (atomic or molecular) and theoretical aspects. The 32 chapters cover, among other subjects: Pt. 1, 1) forms, 2) geographical description and periodicity, 3) methods of observation and photography, 4) height determinations by visual and 5) by photographic methods, 6) measurements near

the auroral belt and 7) outside the auroral belt, 8) measurements and observations in S. Norway 1911-52, 9) sunlit auroras, 10) intensity, 11) color, 12) auroral spectra, 13) spectra of sunlit aurora, 14) radio waves (10 cm) from aurora, 15) corpuscular currents outside atmosphere, 16) radio echoes, from aurora, 17) Doppler studies of corpuscular stream, 18) absorption of corpuscular rays by atmosphere, 19) emission of corpuscular rays from sun. Pt. II, 1) differential equations, 2) results from study of differential equations, 3) families of orbits, 4) numerical integration, 5) intuitive method of control, 6) results of numerical integration (Alfvén's method), 7) application of theory to laboratory experiments, 8) application of theory to polar aurora, 9) limitations of theory, 10) approach of theory to actual conditions, 11) other theories (CHAPMAN-FERRARO, MARTYN and ALFVÉN), 12) other applications, allowed and forbidden regions, solar, magnetic and coronal relations, etc. A good author and subject index and scores of excellent original photographs are included. This is a most satisfying book—one that has been awaited 25 years. (*Same item as 11A-19, MAB.*) *Subject Headings:* 1. Auroral textbooks 2. Auroral theories 3. Auroral photographs 4. Auroral bibliographies.—*M.R.*

11B-136

532.5(02) 551.46:532.59

†Stoker, James Johnston (*Inst. of Math. Sciences, N. Y. Univ.*), **Water waves: the mathematical theory with applications.** N. Y., Interscience Publishers, 1957. 567 p. figs., photos, tables, bibliog. p. 545-560, eqs. Price: \$12.00; 88 sh. **DLC** (QA927.S8). Review by M. S. Longuet-Higgins in *Journal of Fluid Mechanics*, London, 4(4):435-439, Aug. 1958. Review in *Geofisica Pura e Applicata*, 39:234, 1958.—A thorough, systematic and unified treatise on water waves, starting (in Pt. I) with the derivation of the basic theory of nonviscous incompressible fluids, then going on (in Pt. II) to the approximate theory for waves of small amplitude; then (in Pt. III) taking up shallow water waves (which may be long waves) that require a nonlinear solution. Numerical methods of flood prediction are cited with an example from a flood on the Ohio River. Finally (in Pt. IV), the exact theory is applied to short term problems which require nonlinear solutions in the form of power series in time (such as breaking of a dam, or the Levi-Civita theory of two-dimensional periodic progressing waves of finite amplitude in water of infinite depth). In Pt. II problems concerning waves breaking against a vertical cliff, on a sloping beach, or around a vertical wedge are treated, and motions starting from rest, or transients are dealt with, using Fourier transform, Kelvin's stationary phase and Green's function techniques. Finally, applications to waves on a running stream and ship waves are introduced. All sections but Pt. III require a great deal of mathematics. This part goes into simple waves, shock waves, hydraulic jumps, solitary waves, bores, gravity waves in the atmosphere, cold and warm fronts, tides, seiches, oscillations in harbors and aerodynamic applications. The problem of waves breaking at crests is approached from both the laboratory model and from theoretical principles—as are problems of wind wave breakers and long wave breakers in shallow water (surf), and many of the other problems cited above. Models and principles are illustrated by numerous line drawings, as well as by photographs of experimental models. The section on atmospheric waves and cyclonic waves is quite extensive for a book of this type. (*Same item as 10.7-11, July 1959, MAB.*) *Subject Headings:* 1. Water waves 2. Hydrodynamics textbooks 3. Dynamics of atmospheric waves 4. Water wave models 5. Ocean waves 6. Breakers.—*M.R.*

11B-137

551.46(02)(09)(261)

†Stommel, Henry (*Woods Hole Oceanog. Institution*), **The Gulf Stream: a physical and dynamical description.** Berkeley, Univ. of Calif. Press, 1958. 202 p. 80 figs., 7 tables, bibliog. p. 186-197, eqs. Price: \$6.00. **DLC** (GC296.G9S7). Review by R. B. Montgomery in *American Geophysical Union, Transactions*, 40(3):225, Sept. 1959.—A readable yet technical and condensed review, in textbook form, of all of the knowledge from the earliest times, of the Gulf Stream from an oceanographer's point of view. The recorded history of its discovery, measurement and theories regarding its cause, equipment and instruments used in measurement, the geostrophic forces and the density and pressure fields, large scale circulation of North Atlantic hydrographic sections and transfer of masses, wind systems and synoptic situations causing them, linear theories, viscous theory, wind-driven theory of MUNK, nonlinear or inertial theories, meanders, fluctuations: thermohaline circulation; and, finally, general ideas of climate, value of expeditions and research in the theoretical-empirical field (as opposed to pure theory or pure hydrographic surveys) are reviewed. A good bibliography and index are provided. (*Same item as 10.8-10, Aug. 1959, MAB.*) *Subject Headings:* 1. Gulf Stream 2. Oceanography textbooks 3. History of oceanography 4. Gulf Stream 5. North Atlantic.—*M.R.*

11B-138

551.5(02):016 551.511

†Sutton, Sir Oliver Graham (*Met. Office, London*), **Micrometeorology: a study of physical processes in the lowest layers of the earth's atmosphere.** New York, McGraw-Hill, 1953. 333 p. 35 figs., 30 tables, 232 refs., eqs. **DLC** (QC880.S87)—This sizeable book attempts to give a thorough

and systematic treatment of the physics of the surface or ground layer of the atmosphere. The organization of the text is simple: starting with the physics of the atmosphere at rest, then taking up respectively, laminar flow, turbulent flow, heat transfer and diffusion, radiation (short and long wave), temperature, wind structure, diffusion and evaporation. The history of each subject is outlined and the treatment logical from the general to the theories and then the particular aspects and applications (including a detailed bibliography at the end of each chapter). The approach is mathematical but not difficult, and the practical use (e.g., forecasting night minimum temperatures and frost, or problems of diffusion of water vapor or stack gases) is constantly kept in view and elaborated on as far as is possible in a book intended to give general background rather than condensed information such as a handbook or manual would give. A good author and subject index adds much to the usefulness of the book. (*Same item as 4.2-15, Feb. 1953, MAB.*) *Subject Headings:* 1. Micrometeorology textbooks 2. Physics of the atmosphere 3. Micrometeorology bibliographies.—*M.R.*

11B-139

551.551(02)

Sutton, Sir Oliver Graham, **Atmospheric turbulence**. 2d ed. London, Methuen; New York, John Wiley, 1955. 6+111 p. 4 figs., tables, refs., eqs. **DLC** (QC880.S86 1955)—The second edition of this useful little book is brought up to date with an account of KOLMOGOROV's statistical theory, and some minor additions. Successive chapters deal with: Turbulence in general; Meteorology of the lower atmosphere; Early theories and their application to large-scale phenomena; Mixing length and statistical theories of turbulence; Diffusion in the atmosphere near the ground; Turbulence in a variable density gradient. The mathematics, essential to an adequate treatment, are kept as simple as possible. (For abstract of 1st ed., see 4-92, April 1950, 3K-142, March 1952 and 4A-106, Jan. 1953, *MAB.*) (*Same item as 6.9-7, Sept. 1955, MAB.*) *Subject Heading:* 1. Turbulence textbooks.—*C.E.P.B.*

11B-140

51(02) 551.509.313(02)

Sutton, Sir Oliver Graham, **Mathematics in action**. 2d ed. London, G. Bell, 1957. 236 p. 54 figs., refs., eqs. **DWB** (510.4 S967m)—A textbook for laymen and junior college students interested in applications of mathematics to science. Chapters cover history and philosophy of mathematical physics, basic aspects from algebra through differential equations and Laplacian mathematics, ballistics, wave mathematics, Fourier series, aerodynamic applications, statistical applications and, finally, numerical forecasting. The last part of this chapter contains a fine example of a numerical forecast compared with actual observed synoptic pattern, plus a discussion of the principles of numerical prediction. (For abstract on the 1st ed., see 5.10-90, Oct. 1954, *MAB.*) (*Same item as 9.1-10, Jan. 1958, MAB.*) *Subject Headings:* 1. Mathematics in meteorology 2. Numerical forecasting 3. Applied mathematics textbooks.—*M.R.*

11B-141

551.5:629.13(02)

†Szczecinski, Czesław, **Meteorologia na usługach lotnictwa**. [Aeronautical meteorology.] Warsaw, Wydawnictwa Komunikacyjne, 1952. 450 p. 37+15 tables, 164 figs. (incl. photos), map (fold.), 33 refs. **DLC** (TL556.S9)—This modern textbook consists of 14 chapters arranged under 4 major heads: I. Meteorological observations (general, atmosphere, winds and wind regimes, general circulation, water in atmosphere); II. Synoptic meteorology (air masses, fronts, synoptic analysis and forecasting); III. Aviation meteorology (weather effects on airplanes, meteorological service to fliers, climatology as an aid to flying, thermals); IV. Statistical meteorology (tables in the text are listed, and then about 40 pages of nomograms, graphs and tables appear in the appendix). There is a good subject index. Most of the references are to Polish and Russian texts. (*Same item as 6.9-8, Sept. 1955, MAB.*) *Subject Headings:* 1. Aeronautical meteorology textbooks 2. Polish language textbooks.—*M.R.*

11B-142

551.515.2(02) (729.75)

†Tannehill, Ivan Ray, **Hurricanes, their nature and history, particularly those of the West Indies and the southern coasts of the United States**. 9th rev. ed. Princeton, Princeton Univ. Press, 1956. 308 p. 141 figs., tables, bibliog. p. 295-303. Price: \$4.50. (For abstract on 7th ed., see 3.5-13, May 1952; for 8th ed., see 4.7-9, July 1953, *MAB.*) **DLC** (QC945.T32 1956), **DWB**—The last edition of TANNEHILL's classic work on hurricanes (originally published in 1938 and revised in 1942, 43, 44, 45, 50, 52, 53) contains 6 pages of description of hurricanes from 1952-1955, and corresponding revisions in the chronological list, plus charts of tracks of West Indian hurricanes for each year from 1952 through 1955 (in appendix). The basic text remains as it was in the 1945 (6th) edition. The various topics covered in the separate chapters are: history, winds in hurricane, storm wave, origin, tracks, rainfall, pressure, signs of approach, unusual motion, frequency, destructive effects, warnings and precautions, early hurricanes (15th-18th century), hurricanes of 19th century, of 20th century and, finally, a chronology of storms from 1494 to 1900 (from Poëv and others). The appendix is

concerned with observing and forecasting by modern methods (radar, microseisms, sferics, upper winds, synoptic charts, etc.). (See also 4.7-9; 7.6-3; 71-187, MAB.) *Subject Headings:* 1. Hurricane textbooks 2. Hurricane forecasting 3. Hurricane tracks 4. West Indies 5. Atlantic Coast.—M.R.

11B-143

551.5(02)

*†Taylor, George Frederic, **Elementary meteorology** New York, Prentice-Hall, 1954 364 p. numerous figs. (incl. photos), tables, refs. at end of each ch. DWB, DLC (QC863.T37)—This latest textbook on "elementary meteorology" contains much information regarding recent advances in application of theoretical discoveries in astrophysics, atomic physics, oceanography, climatology, hydrology, etc. to meteorology or atmospheric physics. The first chapter discusses the origin of the universe, the solar system and the earth. Ch. 2 takes up the usual weather elements including: paragraph on radar storm detection, sferics and visibility observations; Ch. 3 is on the structure and composition of the atmosphere, tropopause, stratosphere, ionosphere and exosphere; Ch. 4, on heat and moisture, including radiation, stability, energy and mass exchange; Ch. 5, on pressure and local and world wide variations thereof; Ch. 6, on wind and atmosphere circulation—the jet stream, streamline analysis and stratospheric winds; Ch. 7, on condensation and precipitation; Ch. 8, on clouds and fog; Ch. 9, on air masses; Ch. 10, on fronts and storm structure; Ch. 11, on severe storms (tornadoes and squalls); Ch. 12, on tropical weather; Ch. 13, on synoptic charts (surface and upper air); Ch. 14, on weather forecasting; Ch. 15, on climatology. Recent developments in cloud modification, jet stream analysis, radar storm or hurricane tracking and study, contrails, objective weather forecasting, synoptic climatology, planetary atmospheres, extended forecasting, numerical weather prediction, the World Meteorological Organization, etc., are touched on to a greater or lesser degree. Synoptic codes and conversion tables are appended. (Same item as 6.1-7, Jan. 1955, MAB.) *Subject Heading:* 1. Meteorology textbooks.—M.R.

11B-144

551.58(02)

†§Trewartha, Glenn Thomas, **An introduction to climate** 3rd ed. N. Y., McGraw-Hill, 1954. 402 p. numerous figs., tables, bibliog. p. 5-6; 237-238. Price: \$7.00. DLC (QC981.T65 1954)—This valuable text has been completely revised and enlarged as compared with the 1937 and 1943 editions (pub. under title **An introduction to weather and climate**) with 114 new illustrations and a few revised drawings. A new chapter has been added on climatic classification, and the results of 10 years of wartime and postwar research in all parts of the earth incorporated in the text and illustrative material. The book is divided into two main sections. The first part deals with the systematic aspects of climate (insolation, temperature, pressure, winds, moisture, precipitation, air masses, fronts, disturbances and associated weather types). Pt. II deals with the regional patterns of climate models and classification schemes; the author incorporates much more sophisticated concepts and critical evaluation of classification schemes and the like than is customary in geography textbooks. For instance, he shows the variability in temperature from day to day (nonperiodic). The diurnal variation is shown to be of almost as great a magnitude as the periodic (seasonal) variations in some climates; and the variation from year to year in the boundaries of certain Köppen types cover a latitudinal or longitudinal range of 10°, which may be as great as the width of the belt itself when shown on a chart compiled from means. Furthermore, the regional climates are each described in terms of air mass or cyclonic frequencies, frontal passages and resultant weather conditions, and typical synoptic cases presented and discussed in addition to the usual charts of frequency of temperature and precipitation averages and extremes, and thermoisothe charts of diurnal temperature values throughout the year. THORNTWHAITE'S 1943 classification, as well as his 1931 system are described in chapter on classification. Such recent concepts as vorticity, the jet stream, the zonal index and westerly waves are given due consideration. (Same item as 5.9-12, Sept. 1954, MAB.) *Subject Headings:* 1. Climatology textbooks 2. Climatic classifications.—M.R.

11B-145

551.594(02) (47)

Tverskoi, Pavel Nikolaevich, **Atmosfernoe elektrichestvo** [Atmospheric electricity.] Leningrad, Gidrometeoizdat., 1949 250 p. 142 figs., 47 tables, 31 refs., 11 eqs. DLC (QC961.T9)—A textbook presenting a systematic treatment of atmospheric electricity. Special attention is given to thunderstorm electricity. All phenomena are explained by means of physical description and only a minimum amount of mathematical theory is presented. Methods of observation are described. The results of Russian investigations are included here for the first time. The book is intended for scientists in the geophysical field, for candidates for advanced degrees, for senior year students, and for those engineers whose work involves consideration of the electrical phenomena in the atmosphere. The text is divided into five chapters: 1. The electrical state of the atmosphere; 2. Ionosphere; 3. Electrical field of the atmosphere; 4. Thunderstorm electricity and 5. Aurora borealis. (Same item as 4.4-13, April 1953, MAB.) *Subject Headings:* 1. Atmospheric electricity textbooks 2. Ionosphere 3. Thunderstorm electricity 4. Auroras 5. U.S.S.R.—I.L.D.

11B-146

551.5(02)

*†Tverskoĭ, Pavel Nikolaevich (ed.), **Kurs meteorologii: fizika atmosfery** [Course in meteorology: physics of the atmosphere.] Leningrad, Gidrometeoizdat., 1951 887 p. 343 figs., 110 tables, bibl. p. 862-869, eqs. **DLC** (QC861.T85)—The 49 chapters of this monumental textbook on synoptic, dynamic and physical meteorology, are divided into nine major parts (plus 31 pages of introduction, and 10 appended working tables). The first part takes up in 7 chapters the **Structure and physics of the atmosphere** (thermodynamics, temperature, pressure, wind and moisture fields, clouds, fog and precipitation). Pt. II treats of **Radiant energy** (effect of atmosphere, short wave, long wave and radiative balance). Pt. III on **Thermal regime of atmosphere** contains 6 chapters (heat transfer, turbulent exchange, heat balance of sea, earth and lower atmosphere, heat regime of soil and water temperature of microclimatic layer and of free atmosphere). Pt. IV on **Water in the atmosphere** contains 7 chapters: transfer of vapor, change of state, evaporation, condensation, sublimation, fog and haze, clouds, precipitation, and hydrologic cycle. Pt. V on **Dynamics of atmosphere** takes up atmospheric motions, wind at surface and aloft, boundary layers, lapse rates, local and general circulation, relation of pressure, temperature and wind. Pt. VI **Weather and its prediction** discusses synoptic method, air masses, frontal zones, cyclones and anticyclones, general circulation, short and long range forecasts and weather and climate. Pt. VII on **Optical phenomena in the atmosphere** has separate chapters on twilight and other polarization phenomena, visibility, refraction in the atmosphere and halos, etc. Pt. VIII is on **Atmospheric electricity** (ionization, ionosphere, thunderstorm electricity and auroras). Pt. IX **Atmospheric acoustics** takes up ordinary acoustical problems and anomalous propagation of sound. The bibliography gives an extensive list of references (all Russian) for each chapter. Several of the references are to standard western texts translated into Russian. (*Same item as* 3.11-10, Nov. 1952, *MAB.*) *Subject Headings:* 1. **Meteorology textbooks** 2. **Dynamic meteorology** 3. **Synoptic meteorology** 4. **Physical meteorology** 5. **U.S.S.R.** I. Zverev, A. S. II. Kiriukhin, B. V. III. Kondrat'ev, K. Ia. IV. Selezneva, E. S. V. Iudin, M. I.—*M.R.*

11B-147

551.507.362.2(08)

†Van Allen, James Alfred (ed.), **Scientific uses of earth satellites** Ann Arbor, Univ. of Michigan Press, 1956 316 p. figs., tables, bibliogs. throughout. Price: \$10.00. **DLC** (QC807.5.V3), **DWB**—A compilation of 33 of the papers presented at the Upper Atmosphere Rocket Research Panel meeting at Ann Arbor, Mich. on Jan. 26-27, 1956. The papers are devoted to detailed, specific proposals for use of satellites in measuring temperature, density, air-drag, pressure, radiative heat transfer, visibility, hydrogen in space; UV, auroral and cosmic ray flux; geomagnetic field, ionospheric structure, meteoric drag, interplanetary dust, radio propagation, etc., as well as the performance of the satellite itself. (The papers are listed in Pt. III, p. 557, April 1957, *MAB* and have been abstracted separately.) (*Same item as* 8.4-6, April 1957, *MAB.*) *Subject Headings:* 1. **Satellite observatory conferences** 2. **Satellite uses.**—*M.R.*

11B-148

551.593(02)

*†Van de Hulst, Hendrik Christoffel, **Light scattering by small particles.** N. Y., John Wiley; London, Chapman & Hall, 1957. 470 p. 193 figs., 46 tables, bibliog. at end of each ch., numerous eqs. (*Structure of Matter Series*, ed. by Maria Geoppert Mayer.) Price: \$12.00. **DLC** (QC431.H8)—This new and comprehensive text contains 21 chapters divided into 3 main parts: I. Basic scattering theory; II. Special types of particles, and III. Applications. In the first part, wave propagation in a turbid medium, polarization of light, and other basic theory are considered. Pt. II goes into refractive index of small particles, spheres, ellipsoids, cylinders, large particles, optics of raindrops (p. 228-266), flat reflecting particles and Pt. III into extinction, aerosols and, finally, meteorological applications (p. 414-439) including haze optics, smoke from volcanoes and forest fires, cloud, fog and rain optics, radar meteorology, etc. The final chapter (p. 440-444) takes up planetary atmospheres, zodiacal light, interplanetary dust. (*Same item as* 9.1-7, Jan. 1958, *MAB.*) *Subject Headings:* 1. **Optics of small particles** 2. **Atmospheric optics** 3. **Optics textbooks.**—*M.R.*

11B-149

551.5:656.61(02)

Van Duijnen Montijn, J. A.; Pastoor, H. A. et al., **Maritieme meteorologie en oceanografie.** [Maritime meteorology and oceanography.] Hilversum, Netherlands, C. de Boer, 1958. 291 p. 185 figs., tables. Supplement (44 p.) tipped inside back cover, **Bijlage (Wolkenfoto's, kaarten, codes)** [Cloud photos, charts, codes], with special t.p. **DLC** (QC994.D8)—A new and practical text or guide on meteorology, climatology and oceanography for mariners, with a great amount of technical details of value in any phase of marine meteorology. The first 8 chapters deal with observations of temperature, pressure, wind, clouds, visibility, waves and swell, surface currents, and upper air wind, temperature and humidity at sea; the next 6 chapters take up the general characteristics of the atmosphere: water vapor, radiation, heat balance, stability, cloud physics and pressure-wind relations. Sec. III (climatology) has 6 chapters dealing with distribution of the basic meteorological

and oceanographic elements over the earth, variability of these elements, wind, circulation and winds, climate of the individual oceans, climatic charts and atlases of oceans and seas, and the location of the major air masses and fronts. Pt. IV (synoptic meteorology) has 4 chapters on air masses, fronts, frontal disturbances and weather maps, and forecasts. Pt. V has 4 chapters on tropical cyclones, general characteristics, peculiarities of cyclones in the 7 seas, genesis and development of hurricanes, and actual case histories of some hurricanes. Pt. VI has 2 chapters on optical and electrical phenomena in the atmosphere. Pt. VII has 4 chapters on oceanography: description of the oceans, waves, currents and ice; and Pt. VIII has 3 chapters on practical meteorology at sea, international regulations and aids, synoptic maps at sea, and special applications of meteorology for mariners (met. navigation and protection of ship's cargo against meteorological elements). Cloud (code) charts and other codes are appended. Numerous schematic diagrams, maps, charts, cloud photos and a good subject index are included. *Subject Headings:* 1. Marine meteorology textbooks 2. Dutch language textbooks. I. Verploegh, G.—M.R.

11B-150

551.510.5(02):551.521.3:551.593(02)

Vassy, Étienne (*Prof. Faculty of Sciences, Paris*), *Physique de l'atmosphère*. [Physics of the atmosphere.] Paris, Gauthier-Villars, 1956-1959. 2 vol. Vol. 1, issued 1956, *Phénomènes d'émission dans l'atmosphère* [Emission phenomena in the atmosphere]. 338 p. numerous figs. Vol. 2, issued 1959, *Phénomènes de réfraction* [Refraction phenomena]. 227 p. numerous figs., refs., eqs. **DLC** (QC880.V3)—A most complete and up-to-date textbook, based on a lecture course given at the Faculty of Sciences in Paris. The Introduction to Vol. I covers in detail the methods of investigating the upper atmosphere, both direct and indirect (radiosonde, rockets, rockoons, etc.), structure, physics, chemistry, including latest data; Pt. (I) Aurora: history, forms, distribution, frequency, periodicity, spectroscopy, theory, application of results to study of upper atmosphere; (II) Night airglow: measurement, color, spectroscopy, polarization, time and space variations, correlation with other phenomena (ionosphere, geomagnetism, C.R.), origin, etc.; (III) Twilight emission phenomena: oxygen, sodium, nitrogen and their photoluminescence; (IV) Meteor trail luminescence: composition, spectra, mechanism of production, Öpik's theory, results with respect to upper atmospheric winds and structure; (V) Lightning and St. Elmo's fire, Sferics (observation, geographical distribution, structure, frequency, relation to meteorological situation). The second Volume covers all manner of refraction phenomena: astronomical, terrestrial, scintillation, optical phenomena due to water and ice in the atmosphere (rainbows, halos, parhelia, beams), tropospheric refraction of radio waves, vertical variations of refractive index, relation between refraction and propagation, radiometeorology, radioclimatology, ionospheric refraction and, finally, acoustical refraction. The work is full of illustrations of equipment, graphs, records, and data. In each section the theory is treated separately from the application. (For abstract on Vol. 1, see 7.11-1, Nov. 1957, *MAB*.) *Subject Headings:* 1. Atmospheric physics textbooks 2. Emission phenomena 3. Auroras 4. Refraction phenomena 5. Tropospheric radio wave propagation 6. Upper atmospheric physics.—M.R.

11B-151

551.5:63(02)

*Ventskevich, Georgii Zenonovich, *Agrometeorologiya*. [2d ed.] Leningrad, Gidrometeoizdat, 1958. 376 p. 90 figs., 58 tables, bibliog. p. 374-376. **DWB** (M:63 V467ag), **DLC** (S600.V42 1958)—An original textbook, first issued in 1952, on agrometeorology for hydrometeorological technologists or agricultural students, or workers at the college level. A chapter on the climate of fields goes into the soil climate (heat regime), microclimate, phytoclimate, and control of the microclimate. The second chapter takes up the various meteorological elements: radiation and light, temperature of air and soil, precipitation, snow cover and wind. Soil moisture and moisture conservation of plants, water balance, evaporation, transpiration, etc., constitute Ch. 3 and the relation of weather to various specific crops (grain, tobacco, root crops, fruits) and diseases of plants or pests in Ch. 4. Types of weather which are unfavorable for crops (freezes, drought and dry winds, lack of snow in winter, etc.) are the subject of Ch. 5. Agrometeorological observations (networks and their establishment, temperature, humidity of air and soil, phenology, shelter-belt observations, seasonal migration of cattle and sheep, compilation of data and telegraphing of observations and inspection) are discussed in Ch. 6. Public agrometeorological service organization, decadal bulletins, analysis of conditions, forecasts, special service to collectives, etc., preparation of yearbooks, agroclimatic regional studies for long periods, Ch. 7 and, finally, problems and methods of agroclimatic research, agroclimatic regionalization, microclimatic surveys of characteristics of regions, and agroclimatic handbooks and their use, Ch. 8. Many examples of analytical tables, diagrams, charts, bulletins, etc. are included in text. (*Same item as 10.9-7, Sept. 1959, MAB*.) *Subject Headings:* 1. Agrometeorological textbooks 2. U.S.S.R.—M.R.

11B-152

551.324(02) 551.46(02) 551.5(26)(02)

Vercelli, Francesco (*Istituto Talassografico di Trieste*), *Il mare, i laghi, i ghiacciai*. [Ocean, lakes, glaciers.] Turin, Unione Tipografico—Editrice Torinese, 1951. 622 p. numerous photos,

figs., charts, illus., bibliog. p. xiii-xvi. **DLC** (GC11.V45). Review in Italian by A. Vatova, *L'idrosfera e le sue condizioni*. [The hydrosphere and its conditions.] (1952?) **DWB**—A comprehensive, popularly written and profusely illustrated coverage of physical and dynamic oceanography, marine meteorology and morphology, sedimentation, limnology, snow and glaciers. Ch. 5 (p. 149-168) includes discussion of evaporation, heat exchange, and effects of ocean and atmosphere on one another. Other manifestations of ocean atmosphere interaction discussed in Ch. 9 (waves) and Ch. 10 (circulation). This is believed to be the first attempt at so broad, voluminous and vivid a coverage of the many aspects of oceanographic, limnological and glaciological activity enumerated above. A few colored charts and a number of tables and graphs giving quantitative data on each of the topics covered, give the work a superficial resemblance to SCHOTT's classical works on the geography of the Atlantic or of the Pacific and Indian Oceans. (Same item as 5A-54; 5.4-5, MAB.) *Subject Headings*: 1. Oceanography textbooks 2. Marine meteorology 3. Ice 4. Glaciers. I. Vatova, A. —M.R.

11B-153

551.5(02)

Vercelli, Francesco (*Dir. Istituto Talassografico, Trieste*), *L'aria, nella natura e nella vita*. [Air: in nature and in life.] 2d ed. Turin, Unione Tipografico-Editrice Torinese, 1952. 718 p. photos, diagrs., bibliog. p. XXIII. **DLC** (QC861.V47 1952)—This is probably the most handsomely illustrated text on meteorology ever published. The variety of photographic plates, drawings and diagrams included on every page of this ambitious volume is almost encyclopedic in scope. The present edition contains textual and illustrative material on recent findings such as the V-2 rocket flights in New Mexico and the latest research on cosmic rays, auroras, terrestrial magnetism, cloud physics, atmospheric electricity, aviation meteorology, radiation bioclimatology, statistical methods, weather map analysis, long range forecasting, climatic changes, agricultural meteorology, instrumentation, planetary atmospheres, medical climatology, jet propulsion, wind tunnel tests, micro-meteorological instruments, etc. Synoptic charts and references in the text show that the material has been revised up to Sept. 1951. In the 386 sections (21 chapters) a great deal of imagination has been used to see that every conceivable aspect of theoretical and applied meteorology is treated. The various chapters include those on: 1) origin, limits and composition of the atmosphere, 2) pressure, 3) radiation and temperature, 4) radiation balance, 5) atmospheric structure, 6) winds, 7) water vapor and condensation, 8) hydrometeors, 9) atmospheric circulation and disturbances, 10) fluctuations and correlations, 11) forecasting, 12) climatic factors and changes, 13) optics and visibility, 14) acoustics and acoustic soundings, 15) atmospheric electricity, 16) bioclimatology and meteoropathology, 17) agricultural meteorology and micrometeorology, 18) aerodynamics and utilization of air and wind, 19) applications to lighter than air and 20) heavier than air flight, and 21) modern aviation. (Same item as 4.8-16, Aug. 1953, MAB.) *Subject Headings*: 1. Meteorology textbooks 2. Aviation meteorology.—M.R.

11B-154

551.5:629.13(02)

Viaut, A., *La météorologie du navigant*. [Meteorology for aerial navigators.] New rev. ed. Paris, Blondel la Rougery, 1956. 284 p. figs., charts, photos, tables. **DWB** (M:629.12 V623m)—About 25 pages of additional material have been added to the 1949 edition of this most thorough text on aeronautical meteorology. The portions which deal with international aerometeorological matters have been brought up to date. The basic chapters are on: atmospheric structure, pressure, temperature, wind, humidity, instability and turbulence, aeronautical instruments and equipment, upper air, maps and diagrams, circulation, vertical motions, clouds, air masses, fronts, dangerous phenomena, networks, forecasts, and reports and service to pilots. Large colored surface, 500 and 300 mb, cloud system and air mass charts of Northwestern Europe and the North Atlantic for remarkable cyclonic situations in 1955 and 1949 are appended. (For abstract on 1949 edition, see 3-9, March 1950, MAB.) (Same item as 10.2-5, Feb. 1959, MAB.) *Subject Heading*: 1. Aeronautical meteorology textbooks.—M.R.

11B-155

551.582(7):016

*†Vitvitskiĭ, G. N., *Klimaty Severnoi Ameriki*. [Climates of North America.] Moscow, Gos. Izdat. Geogr. Lit., 1953. 287 p. 55 figs., numerous tables, 291 refs. **DLC** (QC983.V5)—A synoptic as well as statistical review of the climate of the entire continent of North America, starting with Alaska and including Canada, Greenland, the United States, Mexico, Central America and the West Indies. The book represents a systematic and creative review and integration of all of the generally available literature on North America or parts thereof as shown in the extensive bibliography. (Same item as 5.11-9; and 6B-174, MAB.) *Subject Headings*: 1. Climatology textbooks 2. Climate of North America 3. North America.—M.R.

11B-156

551.582:631.4(479.24)

†Volobuev, V. R., *Pochvy i klimat*. [Soil and climate.] Baku, Akademiia Nauk Azerbaidzhanskoi SSR, 1953. 319 p. 90 figs., 14 tables, 425 refs. At head of t-p: Akademiia Nauk Azer-

baïdzhanskoï SSR, Institut Pochvovedeniia i Agrokhimii. Added t-p. in Azerbaijani. **DLC** (S591.V67). Review by Michal Strzemski in *Przegląd Geograficzny*, Warsaw, 27(1):164-166, 1955. —A sizeable treatise on soil-climate relationships, elements, classifications, etc., starting with 2 chapters on the historical contribution and ideas of DOKUCHAEV, VOÏKOV and K. D. GLINKA (before the revolution) and of V. P. VIL'JAMS, L. S. BERG, N. N. IVANOV, L. I. PRASOLOV and many others (since the revolution). The second major portion of the book deals with soil formation under various climatic conditions (general, local and microclimatic influences, influence of temperature, precipitation and wind; biological influences and, finally, the effect of the hydrothermal condition). The third part deals with research on soil-climatic relations in the Soviet Union and the U. S. and on the relation between soil mass and climate, pH of the soil and climate, etc. Pt. 4 goes briefly into conservation and reclamation of the soil in connection with climatic conditions and the "Great Stalin Plan for Transformation of Nature." Temperature, moisture, chemical and mineral composition, gaseous content of soil under varying geographic conditions from the tropics to the Arctic are analyzed from a quantitative as well as descriptive point of view. Ample experimental data in the form of tables and graphs, scatter diagrams, nomograms, maps of the world, the U.S.S.R., the U. S. and Azerbaïdzhân in particular, are included. The text has one important omission—a subject index. 425 articles, 391 of which are from Russian sources, are cited in the most thorough bibliography. (*Same item* as 10.10-20, Oct. 1959, *MAB.*) *Subject Headings:* 1. Soil-climate relationships 2. Soil moisture 3. Soil temperature 4. Soil climate bibliographies 5. U.S.S.R. 6. Azerbaïdzhân S.S.R.—*M.R.*

11B-157

551.5:656.61 (02)

Vourlakis, Euaggelou S. (*Dir. Nat. Met. Service, Greece*), **Nautike meteorologia dia tous nautilomenous kai tous aeroporous**. [Marine meteorology for mariners and aviators.] Athens, K. Daniggelis, 1956. 326 p. 73 figs., unnumbered cloud photos, tables, 15 refs. **DWB** (M:551.46 V973ma)—A textbook covering the elements of meteorology with emphasis on marine aspects, especially as applied to the Mediterranean area. The various chapters take up the general ideas, the structure of the atmosphere, radiation and temperature, humidity and nuclei of condensation, surface winds and stability, circulation, clouds, sea, swell, currents and ice, air masses, tropical storms, thunderstorms and squalls, waterspouts and tornadoes, optical phenomena, marine meteorology codes and reports, preparation of weather maps and, finally, analysis and forecasting. Numerous synoptic charts, schematic diagrams and forms, codes, etc. are included. The text is in Greek but there are English equivalents for chapter or paragraph headings liberally scattered throughout. *Subject Headings:* 1. Marine meteorology textbooks 2. Greek language textbooks.—*M.R.*

11B-158

551.509.3 (02)

*†Watanabe, Tsugio, **Modern methods of meteorological analysis**. Tokyo, Gihodo Co., Dec. 1958. 302 p. numerous figs. and tables, refs. at end of each ch. **DWB** (M W314ki)—A small but highly concentrated textbook full of information regarding recent developments and techniques in meteorological analysis and forecasting, starting with a chapter on literature sources from all countries. Statistical, graphical and numerical methods of analysis of data for climatology and forecasting are evident throughout the book. (For fuller abstract, see 11.1-15, Jan. 1960, *MAB.*) *Subject Headings:* 1. Meteorology analysis textbooks 2. Meteorological Abstracts and Bibliography 3. U.D.C. for meteorology 4. Japanese language textbooks.—*M.R.*

11B-159

551.513 (02)

Willett, Hurd C. and Sanders, Frederick, **Descriptive meteorology**. 2d ed. N. Y., Academic Press, 1959. 355 p. 70 figs., plate, eqs. Price: \$7.50. **DWB**—The first edition, published in 1944 (see 4G-5, July 1953, *MAB*), has been brought up to date by inclusion of material on jet stream, climatic changes, numerical prediction, weather control and upper air analysis by charts of baric topography, and revisions of the sections on tropical cyclones, vertical wind movements or eddies (lee waves), tornadoes, smog, nuclei, etc. Objective and statistical, short, extended and long range forecasting techniques are treated together with the more subjective methods, and verification by modern concept is considered. The 10 chapters cover: I. Structure and composition of atoms; II. Adiabatic processes; III. Heat balance; IV. Moisture balance; V. Kinematics (wind); VI. General circulation; VII. Secondary thermal circulation; VIII. Secondary dynamic circulations; IX. Local circulations and severe storms; X. Weather forecasting and modification. The book is intended, as was its predecessor, as a textbook of descriptive meteorology for students with general knowledge of calculus and college physics. The special aspects of physical meteorology on the one hand, and the practical aspects of synoptic meteorology such as map analysis or even observation, have been deliberately avoided. (*Same item* as 10.7-17, July 1959, *MAB.*) *Subject Headings:* 1. Descriptive meteorology textbooks 2. Atmospheric circulation.—*M.R.*

11B-160

551.579(02):016

†Wundt, Walter (*Hon. Prof. Freiburg Univ.*), *Gewässerkunde*. [Hydrology.] Berlin, Springer-Verlag, 1953. 320 p. 185 figs., tables, bibliog. p. 305-310. **DLC** (GB661.W8)—A textbook on hydrology covering in great detail the many aspects of scientific and engineering hydrology. The extensive bibliography is devoted almost exclusively to German literature. (*Same item as 5.2-9 and 6B-177, MAB.*) *Subject Heading: 1. Hydrologic textbooks.—M.R.*

11B-161

551.578.4/7

*†Zamorskiĭ, Aleksandr Dmitrievich, *Atmosfernyi led, inel', gololed, sneg i grad*. [Atmospheric ice, frost, rime, snow and hail.] Moscow, Akademiia Nauk SSSR, 1955. 376 p. 172 figs., 79 tables, bibliog. p. 355-365. At head of t-p: Akademiia Nauk SSSR, Geograficheskoe Obshchestvo SSSR. **DLC** (GB2403.Z3)—This excellent technical text, which is based on a review of hundreds of native and foreign works (cited in bibliography), deals with the processes of formation of the various classes or types of ice, and with the varieties of ice themselves. The formation of ice of various types on the earth and on objects on the earth; ice formation in the atmosphere and falling on the earth (snow, graupel, hail, sleet, freezing rain); the morphology of snow crystals, processes of snow crystal formation, conditions attending falling snow (relation to air temperature, cloud form, air mass, etc.) and many other aspects of snow or ice occurrence are taken up in considerable detail. About 130 works of over 100 western authors are cited in the text. (*Same item as 7.11-12, Nov. 1956, MAB.*) *Subject Headings: 1. Atmospheric ice 2. Rime 3. Snow 4. Hail 5. Frost.—M.R.*

11B-162

551.509 2/3(02)

†Zverev, A. S., *Sinopticheskaiia meteorologiia*. [Synoptic meteorology.] Leningrad, Gidrometeoizdvo, 1957. 558 p. 221 figs., 28 tables, bibliog. p. 545-552, eqs. **DLC** (QC861.Z9)—A new advanced textbook on synoptic analysis and forecasting, with sections on: I. General, historical and service aspects of synoptic meteorology and codes, analysis and forecasting; II. Techniques of analysis of charts of all types, including cross sections, condensation systems, wind fields, etc.; III. General circulation, sources, centers of action, fronts, jet stream, climatological aids, zonal circulation and circulation in various zones, energy transformation; IV. Changes (advective and dynamic) in elements with time-local changes; V. Air masses (their sources, transformation, character, frequency and analysis); VI. Fronts (warm, cold, occlusions, orographic influences and analysis); VII. Cyclones and anticyclones; VIII. Forecasting by various systems used in U.S.S.R., Germany, U. S., etc.; IX. Forecasting actual weather, winds (squalls, blizzards, dust storms, turbulence), temp., clouds and their upper and lower limits, precip., thunder, fog, icing at surface and aircraft icing. Considerable Western material is used in this text. (*Same item as 9.9-8, Sept. 1958, MAB.*) *Subject Heading: 1. Synoptic meteorology textbooks.—M.R.*

PART III. TRANSLATIONS, RECENT MONOGRAPHS, AND ANALYTICS FROM SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological and Geostrophysical Abstracts**.

A. TRANSLATIONS OF IMPORTANT METEOROLOGICAL MATERIAL

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- Bocharov, E. I.: **Spectral transparency of clouds.** (Transl. of original Russian, *Spektral'naia prozrachnost' oblakov*, in *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 5:678-685, May 1958. 7 figs., 2 tables, 5 refs.) Transl. by J. S. Sweet in the English language edition of the *Izvestiia, Bulletin of the Academy of Sciences of the USSR, Geophysics Series*, No. 5:389-394, May 1958, issued 1959. 7 figs., etc.
- Britaev, A. S.; Iozenas, V. A. and Kuznetsov, A. P.: **On the question of the connection between total ozone content and meteorological conditions.** (Transl. of the original Russian *K voprosu o sviazi obshchego soderzhanii ozona s meteorologicheskimi usloviiami in Meteorologiya i Gidrologiya*, Leningrad, No. 10:24-29, Oct. 1958. fig., table, 9 refs., 2 eqs.) Transl. issued as *U. S. Army Ordnance Missile Command, Redstone Arsenal, Alabama, Translation No. 1*, Feb. 1959. 6 p. DWB (M10.534 B862on) (For abstract on original Russian see 10F-168, June 1959, MAB)
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- Fuks, N. A.: **Mechanics of aerosols.** (Transl. of original Russian *Mekhanika aerolei*, issued Moscow, Akademiia Nauk SSSR, 1955. 351 p. 39 figs., 37 tables, 581 refs., eqs. DLC) Transl. by E. Lachowicz issued as *U. S. Chemical Warfare Labs., CWL Special Publications 4-12*, 1958. 448 p. 81 figs., 37 tables, 581 refs., eqs. DWB (M74.1 F961meE) (For abstract on original Russian, see 9.11-6, Nov. 1958, MAB)
- Gerson, N. C.: **Kriticheskiĭ obzor dannykh o temperature ionosfery.** (Transl. of original English, *Critical survey of ionospheric temperatures*, in *Physical Society of London, Reports on Progress in Physics*, 14:316-365, 1951. 18 figs., 10 tables, 142 refs., 116 eqs.) Transl. into Russian in *Uspekhi Fizicheskikh Nauk*, Moscow, 47(4):561-624, Aug. 1952. 18 figs., etc. DLC (For abstract on original Russian see 5.3-127, March 1954, MAB)
- Hollmann, Günther: **On principal shortcomings of the geostrophic approximation and the introduction of ageostrophic wind components.** (Transl. of original German *Über prinzipielle Mängel der geostrophischen Approximation und die Einführung ageostrophischer Windkomponenten*, in *Meteorologische Rundschau*, Berlin, 9(5/6):73-78, May/June 1956. 11 refs., 59 eqs.) Transl. issued as Germany. Deutscher Wetterdienst, *Studies in Numerical Weather Forecasting, Technical and Final Report* (on Contract AF 19(61)-735C, Sec. C (18 p.)) (For abstract on original German, see 7.10-198, Oct. 1956, MAB)
- Kostin, S. I. and Pokrovskaiia, T. V.: **Climatology.** (Transl. of original Russian *Klimatologiya*, issued Leningrad, Gidrometeoizdat, 1953. 426 p. 146 figs., 74 tables, 19 refs., eqs. DWB) Abridged transl. of preface and a complete transl. of the table of contents available for ref., DWB (M8 K86ka). 9 p.
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Shuiskaiia, F. K.: Some results of the spectroscopic study of aurorae and airglow. (Transl. of original Russian *Nekotorye rezul'taty spektroskopicheskikh issledovaniĭ poliarnykh sĭianii i izlucheniia nochnogo neba*, in Krasovskii, V. I., ed., *Spektral'nye, elektrofotometricheskie i radiolokatsionnye issledovaniia poliarnykh sĭianii i svecheniia nochnogo neba*, issued Moscow, Akademiia Nauk SSSR, 1959, p. 61-65. fig., 3 tables, 9 refs.) Transl. by J. Miller issued by American Meteorological Society, under Contract AF 19(604)-1936, as its Transl. T-RC-14+, July 1959.

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Guilcher, A. and Beaujeu-Garnier, J.: *L'Europe du Nord et du Nord-Ouest, Vol. 1, Generalites physiques et humaines* [North Europe and Northwest Europe, Vol. 1, Physical and human generalities]. [Vol. 2, Finland and the Scandinavian countries], by Georges Chabot. both, Paris, Presses Universitaires de la France, 1958. 258 and 371 p.

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Pédélaborde, Pierre: *Le climat du bassin parisien: essai d'une méthode rationnelle de climatologie physique* [Climate of the Paris Basin: attempt at a rational method of physical climatology]. Paris, Genin, 1957. 539 p. tables, bibliog. p. 505-530. Also: *Atlas*. Paris, 1958. 1 vol. (unpaged). charts, diags., tables. DLC (QC989.F8P3)

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Troll, Carl: *Die tropischen Gebirge: ihre dreidimensionale klimatische und pflanzengeographische Zonierung* [Tropical mountains: the horizontal and vertical zonation of their climate and vegetation]. *Bonner Geographische Abhandlungen*, Bonn, No. 25, 1956. 93 p. figs., tables, bibliog. p. 89-93. English summary p. 86-88. DLC

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Haagen-Smit, A. J.: *Urban air pollution*, p. 1-18

Marley, W. G.: *Meteorological aspects of radioactivity pollution*, p. 19-28

Monin, A. S.: *General survey of atmospheric diffusion*, p. 29-40

Panofsky, Hans A. and Deland, Raymond J.: *One-dimensional spectra of atmospheric turbulence in the lowest 100 metres*, p. 41-64

Laikhtman, D. L.: *Boundary layer turbulence and external parameters, (extended summary only)*, p. 65-70

- Pasquill, F.: **Some current work on turbulence in the first few thousand feet above ground,** (*extended summary only*), p. 71-73
- Cramer, H. E.: **Measurements of turbulence structure near the ground within the frequency range from 0.5 to 0.01 cycles sec⁻¹,** p. 75-96
- Priestley, C. H. B.: **The isotropic limit and the microscale of turbulence,** p. 97-100
- Taylor, Sir Geoffrey: **The present position in the theory of turbulent diffusion,** p. 101-112
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- Kampé de Fériet, J.: **Statistical mechanics and theoretical models of diffusion processes,** p. 139-147
- Ogura, Yoshimitsu: **Diffusion from a continuous source in relation to a finite observation interval,** p. 149-159
- Corrsin, S.: **Progress report on some turbulent diffusion research,** (*extended summary only*), p. 161-164
- Tchen, Chan-mou: **Diffusion of particles in turbulent flow,** p. 165-174
- Ogura, Yoshimitsu: **The dependence of eddy diffusivity on the fluid Prandtl number,** (*extended summary only*), p. 175-177
- Lumley, J. L. and Corrsin, S.: **A random walk with both Lagrangian and Eulerian statistics,** p. 179-183
- Iudin, M. I.: **Physical considerations on heavy-particle diffusion,** p. 185-191
- Smith, F. B.: **The turbulent spread of a falling cluster,** p. 193-210
- Deacon, E. L.: **The measurement of turbulent transfer in the lower atmosphere,** p. 211-228
- Hinze, J. O.: **The effect of compressibility on the turbulent transport of heat in a stably stratified atmosphere,** p. 229-234
- Palm, Enok: **On Reynolds stress, turbulent diffusion and the velocity profile in a stratified fluid,** (*extended summary only*), p. 235-239 (*for abstract on complete paper, see 10.2-242, MAB*)
- Letta, Heinz H.: **Wind profile, surface stress and geostrophic drag coefficients in the atmospheric surface layer,** p. 241-257
- Robinson, G. D.: **Vertical motion and the transfer of heat and momentum near the ground,** p. 259-268
- Frankenberger, E.: **The frequency distribution of vertical diffusion coefficients for vapour at 35 m. height,** p. 269-271
- Machta, Lester: **Transport in the stratosphere and through the tropopause,** p. 273-288
- Peters, B.: **On the use of cosmic ray produced isotopes for studying large scale circulations in the atmosphere,** p. 289-296
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- Scorer, R. S.: **Buoyant transfer in a stable environment,** p. 299-301
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- Inoue, Eiichi: **The effects of thermal stratification on turbulent diffusion in the atmospheric surface layer,** p. 319-330
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- Hay, J. S. and Pasquill, F.: **Diffusion from a continuous source in relation to the spectrum and scale of turbulence,** p. 345-365
- Dingle, A. N.; Gill, G. C., Wagner, W. H., Jr. and Hewson, E. W.: **The emission, dispersion, and deposition of ragweed pollen,** p. 367-387
- Barad, Morton L.: **Analysis of diffusion studies at O'Neill,** p. 389-398
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- Schmidt, F. H.: **On an apparent paradox in the theory of vertically rising jets,** p. 421-423
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- Tel'e, E. and Tel'e, O.: **Ob intensivnosti magnitnogo polia Zemli v istoricheskom i geologicheskopoluprostranstve**, [The intensity of the magnetic field of the earth in the historical and geological past], p. 1296-1331
- D'iakonov, B. P.: **Difraktsiia elektromagnitnykh voln na kruglom tsilindre v odnorodnom poluprostranstve**, [Diffraction of electromagnetic waves on a circular cylinder in a homogeneous semi-space], p. 1332-1343
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- Kogan, S. Ia.: **Opredelenie energii ob'emnykh seisnicheskikh voln**, [Determination of the energy of volumetric seismic waves], p. 1372-1374
- Solov'ev, S. L. and Shein, V. B.: **Intensivnost' zemletriasenii po dannym dal'nevostochnykh i kontinental'nykh stantsii SSSR**, [Earthquake intensity according to data from far eastern and continental stations in the U.S.S.R.], p. 1375-1385
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- Savarenskii, E. F.: **Elementarnaia otsenka vlianiia sloia na kolebaniia zemnoi poverkhnosti**, [Elementary evaluation of the influence of a layer on oscillations of the earth surface], p. 1441-1447
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